DOCUMENT RESUME

ED 209 435 CE 030 366

AUTHOR	Browning, Robert F.; And Others
TITLE	Preparation and Design for a Training Effectiveness Evaluation of Device 2F64C for Replacement Pilot Training.
INSTITUTION	Naval Training Analysis and Evaluation Group, Orlando, Fla.
REPORT NO	TAEG-108
PUB DATE	Aug 81
NOTE	100p.
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	Adult Education; Aircraft Pilots; Curriculum Design; *Equipment Evaluation; *Flight Training; Military Personnel; *Military Training; *Online Systems; *Program Effectiveness; Program Evaluation; *Simulation

ABSTRACT

This report details the setting up of a program to assess the training potential of a new simulator (Device 2F64C) for training SH-3 replacement helicopter pilots. Section 2 describes the training situation at the fleet readiness squadron prior to and during the transition to a new curriculum that resulted from an instructional system development program. Section 3 discusses factors impacting on syllabi content and the process used in developing syllabi for assessing training effectiveness of Device 2F64C. A description is provided of the development of detailed scripts to ensure effective implementation of a syllabus designed to realize the maximum potential of the new device. Section 4 outlines the experimental plan for assessing the training effectiveness of Device 2F64C. The training regimen for a control group, performance data, and data collection process is described. Appendixes, amounting to approximately three-fourths of the report, include an excerpt of a training aid developed to facilitate learning of complex procedures and evaluate a computer authoring and editing system, two scenarios that are examples of a set developed for evaluating Device 2F64C, list of tasks on which the control group was trained, and a list of training tasks for the experimental group. (YLB)

TAEG Report No. 108

PREPARATION AND DESIGN FOR A TRAINING EFFECTIVENESS EVALUATION OF DEVICE 2F64C FOR REPLACEMENT PILOT TRAINING

Robert F. Browning
William C. McDaniel
Paul G. Scott

Training Analysis and Evaluation Group

August 1981

Alfred F. Smode

ALFRED F. SMODE, Ph.D., Director
Training Analysis and Evaluation Group

W. L. Maloy

W. L. MALOY, Ed.D.
Deputy Chief of Naval Education and Training for Educational Development/Research, Development, Test, and Evaluation

ACKNOWLEDGMENT

The initiative of the Commander Helicopter Antisubmarine Wing ONE in requesting a training effectiveness evaluation of Device 2F64C well in advance of its expected delivery, made possible the extensive preparations that were completed prior to its acceptance. This foresight provided the opportunity to systematically identify the training requirements, train a control group, and develop a comprehensive assessment plan. These efforts resulted in new syllabi and simulator scenarios designed to capitalize on the unique capabilities of the new device. The syllabi and scenarios were ready for implementation when the device came on line.

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER TAEG Report No. 108	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) PREPARATION AND DESIGN FOR A TRAINING EFFECTIVENESS EVALUATION OF DEVICE 2F64C FOR REPLACEMENT PILOT TRAINING		5. TYPE OF REPORT & PERIOD COVERED 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Robert F. Browning, William C. McDaniel, and Paul Scott		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Training Analysis and Evaluation Group Orlando, FL 32813		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE August 1981 13. NUMBER OF PAGES 95
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution is unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Training Effectiveness Evaluation
Helicopter Replacement Pilot Training
H-3/SH-3 Helicopter Training
Scenario
Syllabi
Replacement Pilot Training
Task Analysis
Transfer of Training
Procedure Training Aids
Low Fidelity Trainer

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report presents the initial effort in a program to assess the training potential of a new simulator (Device 2F64C) for training SH-3 replacement helicopter pilots.

The report provides an account of the work accomplished and the preparations for assessing the device when ready-for-training.

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DD FORM 1473, 1 JAN 73 EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102-014-6601

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

20. ABSTRACT (continued)

The report contains:

- a description of the training situation at the fleet readiness squadron prior to and during the transition to a new curriculum which resulted from an instructional system development (ISD) program
- a discussion of TAEG's initiatives to enhance the training of replacement helicopter pilots
- a discussion of the factors impacting on syllabi content and the process used in developing syllabi for assessing the training effectiveness of Device 2F64C
- a description of the detailed scenarios developed to ensure effective implementation of a syllabus designed to realize the maximum potential of the new device
- the outline of an experimental plan for assessing the training effectiveness of Device 2F64C.

A subsequent report will provide the results of a transfer of training study designed to assess the training effectiveness of Device 2F64C.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF ILLUSTRATIONS

LIST OF TABLES

SECTION I

INTRODUCTION

Flight simulation can be employed to substantial advantage in military flight training, both in terms of effectiveness and efficiency. This is particularly so for first-tour replacement pilot training in multipiloted aircraft. New state-of-the-art flight simulators for these aircraft provide sufficient fidelity and capability to account for most training requirements. Safety is not compromised since these pilots assume less than the plane commander role upon assignment to an operational unit.

In this context, Commander Helicopter Antisubmarine Wing ONE (COMHSWING ONE)[1] requested that the Chief of Naval Education and Training (CNET) task the Training Analysis and Evaluation Group (TAEG) to evaluate the training effectiveness of Device 2F64C for training SH-3 replacement helicopter pilots. The intent was to determine the potential of the simulator as a substitute environment for learning aircraft tasks and to effectively integrate the simulator into pilot training. The CNET-approved request[2] included the following objectives:

- conduct a training analysis of the current Helicopter Antisubmarine Squadron ONE (HS 1) fleet readiness squadron (FRS) pilot and copilot curriculums to assess their effectiveness
- determine, on the basis of the training analysis data, the requirements of the pilot and copilot positions in the SH-3 helicopter
- develop syllabi for pilot and copilot training specifying the appropriate media for developing the required skills
- upon delivery of Device 2F64C, assess its training effectiveness.

PURPOSE

This study is the initial effort in a program to assess the training potential of a new simulator and to provide inputs to the development of a curriculum that would capitalize on the simulator's unique capabilities. An account of the work accomplished and the preparation for assessing the device when ready-for-training is provided in this report. It is the "setting up" phase of the program and is a prelude to the major and subsequent effort concerned with assessing the training effectiveness of Device 2F64C. A second report will present the results of a transfer of training study designed to assess the training effectiveness of the new device.

PERSPECTIVE

The program currently underway, with the initial effort described in this report, has a number of features worthy of note. Perhaps the most

[1]COMHSWING ONE ltr ser 208 of 12 June 1978.

[2]CNET ltr Code N-531 of 26 July 1978.

significant is the opportunity to assess the contribution of a "brand new" on-line high fidelity simulator in producing qualified helicopter pilots for fleet assignments. Evaluating the potential of a state-of-the-art flight simulator concurrent with its acceptance by the Navy and in an operational setting is a rare opportunity. The precedence for this extremely important and difficult undertaking "in situ" was the efficient integration of the then new Device 2F87F into the ongoing FRS P-3 pilot training (VP 30) without interrupting or delaying the pilot production commitments (Browning, Ryan, Scott, and Smode, 1977; Browning, Ryan, and Scott, 1978; Ryan, Scott, and Browning, 1978).

Another unique feature of the present program was the opportunity to develop simulator and inflight syllabi tailored to the new device and to prepare precise, detailed, and realistic scripts (real-world scenarios) for achieving the syllabus objectives. To our knowledge, this is one of the Navy's first systematic attempts to design a syllabus to take advantage of the specific capabilities of a high fidelity flight simulator and to write complete scenarios for its utilization prior to the device ready-for-training date.

The decision to produce these complex, difficult, and time-consuming products underscores the belief that, in large part, the manner in which a flight simulator is used determines its effectiveness in producing pilots.

ORGANIZATION OF THIS REPORT

In addition to this introduction, the report contains three additional sections and four appendices. Section II describes the training situation at the FRS prior to and during the transition to a new curriculum which resulted from an instructional system development (ISD) program. It also discusses TAEG's initiatives to enhance the training of replacement helicopter pilots.

Section III discusses the factors impacting on syllabi content and the process used in developing syllabi for assessing the training effectiveness of Device 2F64C. The development of detailed scripts to ensure effective implementation of a syllabus designed to realize the maximum potential of the new device is also described.

Section IV presents an outline of the experimental plan for assessing the training effectiveness of Device 2F64C. In addition, the training regime for a control group, data on their performance, and the data collection process are described.

Appendix A contains an excerpt of a training aid developed to facilitate learning of complex procedures and to evaluate a TAEG-developed computer authoring and editing system. Appendix B contains two scenarios which are examples of a set developed for evaluating Device 2F64C. Appendix C contains a list of the tasks on which the control group for the planned evaluation studies was trained. Appendix D provides a list of training tasks for the experimental group, identified by computer codes. This appendix also contains a cross reference that identifies where and when each task is scheduled for training.

SECTION II

TRAINING ANALYSIS

Prior to developing a syllabus or modifying an existing curriculum, it is essential that the training situation be analyzed from several vantage points. This analysis includes examination of the current syllabus (if there is one), a description of the tasks/skills to be trained, the task structure or hierarchy, the resources available, and the timing and sequencing of training. Within this framework, three major initiatives are described in this section. The first examines the ISD program for the HS community. The second describes the basic replacement pilot curriculum at HS 1 during the transition to an ISD self-paced instructional program. The third outlines the initiatives undertaken to enhance the academic and cockpit procedures training phases of replacement pilot training.

Fleet readiness training of SH-3 replacement pilots is conducted by HS 1 at Naval Air Station (NAS) Jacksonville and by HS 10 at NAS North Island. Both squadrons have had syllabi specific to their locations and to the requirements of the fleet squadrons they serve. In the past, neither had a curriculum developed by systematically identifying skill requirements via a formal task analysis. However, during the initial examination of the training situation at HS 1 it was learned that HS 10, the west coast FRS, was engaged in a curriculum development effort. Subsequent liaison with HS 10 revealed that a formal instructional development effort, under the sponsorship of the Chief of Naval Operations (OP-594), was nearing completion. The goal for this effort was to provide a standard SH-3 curriculum for both HS 1 and HS 10. A member of TAEG visited HS 10 to discuss aspects relevant to HS 1. The task inventory, training/behavioral objectives, curriculum guide, and lessons were obtained for an in-depth evaluation. The relevance of these documents to the HS 1 training situation is discussed in the following paragraphs.

HELICOPTER ANTISUBMARINE SQUADRON 10 INSTRUCTIONAL SYSTEM DEVELOPMENT

Helicopter Antisubmarine Squadron 10, with the assistance of personnel from the Navy Personnel Research and Development Center and Courseware, Incorporated (contractor for the SH-2 ISD), developed a new curriculum for the SH-3 using the ISD process. The team used the documentation developed for the SH-2 ISD as source material. This was possible due to substantial similarities in the mission and operating procedures of the two aircraft. Where appropriate, SH-2 task statements applicable to the SH-3 were adopted. In other instances, task statements unique to the SH-3 were formulated by the team. The same process was used to develop behavioral objectives, lessons, and media.

ANALYSIS OF THE HS 10 ISD. The task inventory, behavioral objectives, curriculum outline, lesson plans, student workbooks, and audiovisual programs developed by HS 10 were examined in detail by TAEG to determine their relevancy to HS 1 training requirements. The utility of these products is discussed in the following paragraphs.

Task Statements and Behavioral Objectives. Most of the task statements and behavioral objectives developed by HS 10 were determined to be applicable to the HS 1 training situation. Those rejected were for the most part area-specific such as mountain flying, slope landings and takeoffs, and North Island operating procedures.

Curriculum Outline and Lesson Book. The curriculum outline and lesson book was examined to trace each lesson back to the original task statement. This was somewhat difficult as lesson titles or numbers were not referenced to the task inventory. However, most of the stated objectives within the lessons were referenced to the original task statements. The designation of instructional units and the order of presentation were somewhat confusing and ambiguous. For example, Exercise AF-1 contained at least 15 lessons, Cockpit Procedures Trainer/Operational Flight Trainer (CPT/OFT) sessions, and at least one flight. Unfortunately, the flight was also designated AF-1. Helicopter Antisubmarine Squadron ONE resolved this problem by redesignating the units of instruction. Unit AF-1 is now AM-1.

The order of scheduling CPT/OFT and aircraft periods in the curriculum outline was no doubt influenced by the availability of a single obsolescent flight simulator at HS 10. Significant changes have been made in the instructional strategy utilized with the various training devices available to HS 1. These changes are discussed later in this section under Enhancement of the HS 1 Curriculum and also in section III.

Helicopter Antisubmarine Squadron 10 Academic Syllabus. The academic syllabus developed by HS 10 uses a student workbook as a core document, supplemented with audio tapes, sound slide programs, and videotapes. A training package containing these products was furnished to HS 1 for implementation although some of the workbook units and audiovisual programs were not complete. Additional workbook units were furnished as completed; however, a recent inventory by TAEG in company with the HS 10 ISD officer identified a number of audiovisual programs yet to be received by HS 1. Arrangements have been made by HS 10 to furnish the missing programs.

Results of the Analysis of the HS 10 ISD. The method used by HS 10, while somewhat atypical, effectively identified the tasks to be trained by that squadron. With the exception of those tasks unique to training locale, they are considered appropriate for training at HS 1. The tasks requiring training have been effectively translated into training/behavioral objectives. The ISD materials developed to meet these objectives are considered appropriate for the academic phases of HS 1 training. The examination indicated that there was no need for TAEG to duplicate the extensive effort by HS 10 but rather should direct its attention to developing syllabi and supplemental materials (where appropriate) for assessing the training effectiveness of Device 2F64C prior to its acceptance as ready-for-training.

HELICOPTER ANTISUBMARINE SQUADRON ONE REPLACEMENT PILOT CURRICULUM. In addition to HS 10 data, the HS 1 training situation was examined as a basis for developing a replacement pilot syllabus. The HS 1 training situation is described below.

Helicopter Antisubmarine Squadron ONE trains approximately 90 replacement helicopter pilots each year, distributed over 10 classes. Approximately 40

of the pilots trained annually are first-tour pilots, recently graduated from Navy Undergraduate Pilot Training (UPT). The basic syllabus is designed for the Category I (CAT I) UPT graduate being trained for assignment to an operational SH-3 Antisubmarine Warfare (ASW) squadron. Category II, III, and IV pilots receive variations of the basic syllabus dependent upon previous experience, performance at HS 1, and/or ultimate assignment. The CAT I curriculum was addressed by TAEG due to the essentially identical experience level of the newly designated Naval Aviators. The conventional CAT I curriculum includes the following:

- Individual study program using the HS 10 developed workbook and media
- SH-3 systems lectures and special lectures such as course rules and Search and Rescue (SAR)
- Part-task training in the CPT, OFT, and tactics trainer
- SH-3 inflight training
- Antisubmarine Warfare
- Instrument Ground School
- Fire Fighting*
- Nuclear Weapons Delivery*
- Survival, Escape, Resistance, and Evasion (SERE)*
- Naval Air Maintenance Training for Pilots*
- Oceanography*
- Swimming*
- Physiological Training*
- Pistol Qualification*

*Denotes training provided by commands other than HS 1.

As can be noted, a number of courses are given to CAT I students by other commands. Enrolling students on a quota basis in these courses without interfering with an ordered structure of simulator and aircraft training flights at times creates scheduling problems for HS 1.

Flight Training. The conventional CAT I flight syllabus at HS 1 is conducted in the following stages:

A Stage--primarily devoted to Visual Flight Rules (VFR) transition tasks that include takeoffs/landings, autorotations, basic VFR airwork, and emergency/malfunction training.

B Stage--basic instruments, airways navigation, instrument approach procedures, Search and Rescue (SAR) procedures, and special procedures in preparation for the tactical employment of the aircraft; e.g., approach to and departure from hover, sonar deployment, and associated emergencies and malfunctions.

E Stage--review of A and B stage training to prepare for and accomplish the Naval Air Training and Operating Procedures Standardization Program (NATOPS) check.

S Stage--water operations, low level navigation, and confined area operations.

T Stage--tactics stage, introductory inflight ASW training.

ENHANCEMENT OF THE HS 1 CURRICULUM

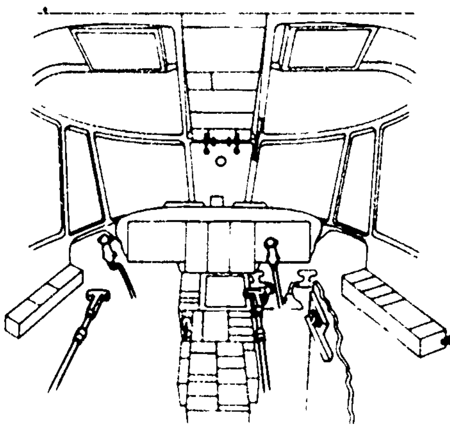
As indicated earlier, the HS 10 ISD fulfilled most of the objectives for the academic portion of the HS 1 fleet readiness curriculum. Thus, the TAEG efforts were directed toward supplementing the HS 10 effort and tailoring materials and methods of presentation to meet HS 1 training requirements. Specifically, this entailed developing supplemental academic materials and redesigning part-task training to facilitate student preparation for later simulator and flight training.

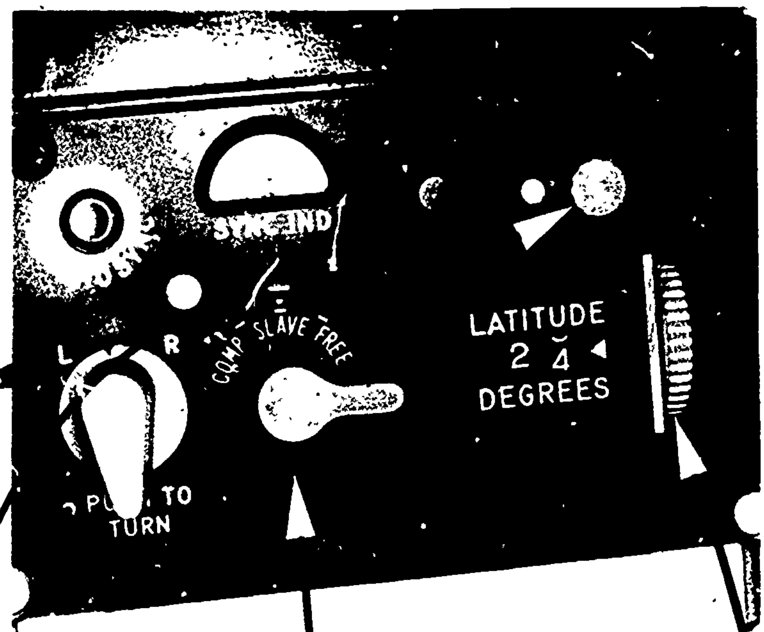
SUPPLEMENTAL TRAINING MATERIALS. After HS 1 adopted the HS 10-developed student workbook, it was noted that students were having difficulty learning the complex checklists and associated procedures for starting and completing systems checks for the SH-3 aircraft. For example, approximately 200 operations are required to complete the 32 items on the normal start checklist for No. 1 engine. The workbook, while presenting extensive information, is difficult for the student to use in learning complex procedures that require locating the many switches and panels and performing certain operations. To supplement the workbook and the NATOPS manual, a prototype procedures training aid and a two-dimensional cockpit representation were developed for use by the students in the training carrel and/or for home study. These are described next.

Procedures Training Aid. The SH-3 Normal Start Procedure (see figure 1 and appendix A) training aid is based upon TAEG-developed guidelines and algorithms for teaching complex procedures (Aagard and Braby, 1976). The algorithm features high visual-low verbal instruction in a precise pattern of presentation to provide the stimulus for student response with practice opportunities and self-checks. This instructional pattern is expected to produce the desired behavior when the student first attempts the tasks in the cockpit procedures trainer. While this test of the procedures training was developed using conventional media technology, future versions will be produced with the TAEG-developed computer authoring and editing system. Similar aids are currently being developed to train operators to perform SONAR/MAD power off and power on preflight checks. These aids will be evaluated for use in the enlisted Replacement Aircrew (RAC) Training Program.

NORMAL START CHECKLIST ITEM NO. 1. Circuit Breakers and Switches .... CHECK

Purpose: To verify that the circuit breakers are IN and switches are set as appropriate.





PILOT

1. Action

   Set Compass Control Mode switch to SLAVE

2. Action

   Set latitude to current position

3. Action

   Set hemisphere to N or S as appropriate

GO TO PAPER MOCK-UP • STEP THROUGH ITEM • TOUCH WHERE EACH ACTION AND RESPONSE TAKES PLACE

SH-3 Paper Cockpit Mock-up. A paper mock-up of the SH-3 cockpit was developed for use in conjunction with the procedures training aid, the student workbook, and/or the NATOPS manual for learning the cockpit nomenclature, location of controls, switches, instruments, and the various checklists. The paper trainer is a two-dimensional facsimile of the pilot and copilot side consoles, center console, instrument panel, and overhead panels. The panels were reduced in size to fit on a desk top or in a training carrel but are large enough that nomenclature, switches, and instruments can easily be read or identified.

Copies of the paper trainer are furnished to each student to practice the various checklists and procedures prior to CPT training. This concept was adopted based on successful application at a number of commercial airline training centers. The effectiveness is enhanced when used jointly by two students in a challenge/reply situation.

SYLLABUS DEVELOPMENT FOR THE COCKPIT PROCEDURES TRAINER, DEVICE 2C44. In order to achieve the required experimental design for a training effectiveness evaluation of Device 2F64C (the new state-of-the-art flight simulator), certain revisions in utilization practices were necessary. The HS 1/HS 10 syllabi provided for an integrated CPT/OFT and flight regime. This intermingling of training media would confound attempts to measure the effectiveness of each medium. Accordingly, a new syllabus was designed to complete CPT training before OFT or flight training so that the effectiveness of the CPT for training various tasks could be measured.

Tasks to be trained in the CPT were selected from the current tasks trained in the CPT at HS 1 and from the task statements developed by HS 10. This resulted in identifying 70 discrete tasks for inclusion in the revised CPT syllabus. The syllabus was also restructured to ensure that normal procedures were introduced and trained in earlier sessions with gradual addition of emergencies and malfunctions in later sessions. The number of tasks scheduled for each period was tailored to meet an allotted 2.0 hours per training session. To meet the requirements of introducing, practicing, and testing the 70 tasks, a basic syllabus of seven sessions was constructed.

SECTION III

SYLLABI AND SCENARIO DEVELOPMENT

Utilization practices and engineering design determine the training potential of a device. Since the hardware and software design are the "givens," considerable attention has been devoted to utilization practices. Major contributors to effective utilization are syllabi tailored to the new 2F64C and scenarios of the detail and realism necessary to achieve syllabus objectives.

This section describes the syllabus development process for determining what to train, where to train, and how to train. It also discusses the role of scenarios in achieving syllabus objectives and effectively utilizing a new flight simulator.

SYLLABI DEVELOPMENT

At the outset, an inventory of tasks trained in the CPT, the older OFT (Device 2F64B), and the SH-3 was assembled to assist in determining the tasks to be trained in the new flight simulator. In examining the training tasks, it was noted that the nomenclature was not standardized. Various names were sometimes used for the same task. A number of tasks, particularly those trained in the CPT, were in fact composites of several distinct tasks. To avoid confounding the grading system and to assure accurate collection of performance data, task nomenclature was standardized and composite tasks separated.

The revised list of training tasks was then compared to the training objectives developed by HS 10 (see section II). The tasks being trained by HS 1 were found to be generally consistent with the HS 10-developed training objectives. However, the tasks were not necessarily trained in the same order in the training devices or aircraft.

SH-3 mishap data for the past 3 years were requested from the Naval Safety Center. These data were obtained to verify that HS 1 malfunction and emergency training realistically reflected what was currently happening in the SH-3 aircraft. Data were analyzed for type and frequency of occurrence and then compared to the HS 1 task training. It was found that the HS 1 training generally encompassed the types of malfunctions and emergencies experienced in actual mishaps. However, the emphasis placed on certain malfunctions and emergencies was not always reflected in the number of actual mishaps reported; e.g., flex shaft failures. This suggests a need for modifications. However, judgments concerning deemphasis of any task will be deferred until the training effectiveness of the new device is determined and then modifications will be made only with HS 1 approval.

ALLOCATION OF TRAINING TO MEDIA. With the "tasks to be trained" identified, "where to train" and "how much to train" remained to be determined. Whether the training should take place in the CPT or OFT was determined by applying the principle of using the simplest media that could be expected to provide effective training. This decision was based on previous experience and on reported research on device effectiveness. Tasks concerned

with learning nomenclature, checklists, certain procedures, and malfunction and emergency training that did not require visual, motion, or dynamic flight control simulation were scheduled into the CPT. Training for tasks requiring dynamic flight simulation such as landings, autorotations, and instrument training was necessarily deferred to the OFT. This approach is more cost effective since it conserves the OFT for training tasks that require high fidelity simulation.

Tasks to Be Included in the Simulator Syllabus. Determining which tasks should be included in the simulator syllabus and the amount of training required necessitated establishing a data base for comparing student performance under various training regimes. To establish this data base a group of students was trained to proficiency in the CPT, utilizing the new syllabus described in section II, and then trained to proficiency in the SH-3. The performance data on this group provided insights concerning the number of trials received, the number required to achieve proficiency in each task, and the degree that CPT training transferred to the aircraft. This group will also serve as the control group for the subsequent experiments assessing the effectiveness of the new OFT when it comes on line. The composition of the control group, the training regime, and the results of the analysis of performance are discussed in section IV of this report.

It is important at this time to note that in general the amount of transfer of training from the CPT to the SH-3 aircraft was proportional to the fidelity of simulation of the CPT. For example, many of the simple procedural tasks, not highly dependent on high simulation fidelity, were performed to standard on the first aircraft trial. As the tasks become more complex and dependent upon the fidelity of control, display, and motion dynamics, the number of training trials required to achieve proficiency in the aircraft increased.

Tasks introduced in the CPT which cannot be fully trained due to fidelity limitations must be included in the OFT syllabus for further training. Attention was also given to continuing the training of malfunctions and emergencies begun in the CPT but without the stress of controlling a simulated aircraft while coping with them.

All of the tasks previously trained in the aircraft were included in the simulator syllabus if their accomplishment was considered feasible based on the advertised simulator capability. A number of tasks not previously trained or trained under severe restrictions in the aircraft due to the risk involved were included in the new simulator syllabus. These include blade stall, power settling, dual engine failures, tail rotor drive failures, and autorotations to the ground. Single engine water landings and takeoffs were also included since the opportunity to practice these tasks is seldom provided due to the unavailability of a specially configured aircraft.

The expected capability of the new high fidelity simulator will add a new dimension to FRS training. Due to the obsolescence of the older flight simulator and squadron policy of conducting aircraft training almost entirely in the right seat (pilot seat), little opportunity was provided for training in left seat (copilot) duties. Feedback from operating squadrons indicated a need for this training. This coupled with the capability of the new

device to provide crew coordination training (simultaneous training of pilot and copilot) dictated that copilot training be included in the new simulator syllabus.

In essence, the final selection of tasks appropriate for training in the new simulator was influenced by the simulation capability of the device, the advice of other users of H-3 simulators, and the concurrence of squadron subject matter experts.

Amount of Training Required. After identifying the tasks to be trained and the capability of the device for training these tasks, "how much to train" remained to be determined. This decision was based on the assumption that CPT training would transfer to the new simulator with approximately the same values as to the aircraft. Therefore, the data concerning the number of trials given and trials to achieve proficiency for the control group in the aircraft influenced the amount of training scheduled for each task in the simulator.

The simulator syllabus to be maximally effective should satisfy stringent requirements. To be sufficient, it must provide opportunities to continue the training of tasks only partially trained in the CPT, training of tasks requiring dynamic flight simulation, training of high risk tasks, and training in copilot duties. In addition to the above training requirements, provisions must be made to refresh newly acquired skills at regular intervals. The TAEG syllabus design meets these requirements.

Number of Syllabus Periods Required. The number of simulator periods needed to meet the various training requirements was determined through a summing process. It was determined from the inventory of training objectives, analysis of mishap data, HS 1 syllabi, high risk training requirements, and the added requirement for copilot specific training that 157 tasks should be included in the syllabus. Tasks previously trained in the CPT had to be tested or trained and tested as appropriate. Tasks introduced for the first time had to be practiced, tested, and the new skills refreshed at appropriate intervals.

Instrument training, which was formerly conducted only in the aircraft in B stage, was included along with other transition tasks in the A stage simulator syllabus. All A stage simulator sessions are completed prior to A stage flight training. B stage simulator training which is concerned with operational tasks such as approach to and departure from hover, sonar dipping, emergencies and malfunctions associated with these maneuvers, and SAR procedures is then completed in a second block of simulator training. This training is followed by B stage flight training.

The time required to practice each task in the new simulator was estimated in one of several ways: performing each task in the CPT, the SH-3, an instrument trainer, or the paper mock-up or estimating by instructors. Simulator periods were scheduled for 4 hours to be shared by two students. Each student receives approximately 1 hour and 45 minutes of training in each seat. One hour and forty-five minutes was selected based on an estimate of the time required for an inexperienced pilot to make a start, complete the various checks, takeoff, perform a reasonable number of training tasks, and then practice landings.

This summing process resulted in a requirement for seven A stage and six B stage simulator periods to practice, test, and refresh the large number of tasks included in the syllabus. The syllabus was designed to accommodate the student who can demonstrate proficiency in fewer than the allotted periods and for the student who may require additional periods. Sample A and B stage syllabus grade sheets are included in appendix B with corresponding scenarios for accomplishing these tasks.

SIMULATOR SCENARIO DEVELOPMENT

A simulator training period without a detailed script most often results in a series of discrete events not necessarily organized or directed toward accomplishing specific objectives. To effectively instruct in a flight simulator, the instructor must be able to do more than operate the instructor console and create a series of emergencies and malfunctions that may or may not be in context with the flight profile. Too often students are given tasks unrelated in sequence, or without regard for readiness to cope with them. A review of completed flight grade sheets revealed a wide divergence in the number of trials given for a particular task or the emphasis placed on various tasks by the instructors.

To ensure that students receive training in all tasks under similar conditions, detailed scenarios (scripts) were needed. Complete and relevant scenarios provide for introducing tasks at the appropriate time, training to proficiency, testing, and refreshing previously learned skills at regular intervals. A scenario provides the instructor with a complete profile for the flight including environmental conditions, starting configuration of the simulated aircraft, clearances, and expected student responses. The well prepared scenario provides the key to effectively using the unique capabilities of the device such as freeze, playback, demonstration, flight path printouts, monitoring and feedback capabilities, and an array of malfunctions and emergency situations.

Without a script or scenario, instructors, particularly inexperienced ones, tend to omit required voice calls, leave out or issue in the wrong order significant elements of an instrument clearance or ground controlled approach (GCA) instructions, and fail to adhere to the same standards or procedures required in the aircraft. Standardization is almost nonexistent without a script or scenario; each student gets a different array of training tasks and/or opportunities to practice.

Unfortunately, developing meaningful scenarios is a time-consuming activity requiring considerable subject matter expertise. However, it was decided that the need for these scripts was paramount to successful evaluation; accordingly, 13 two-part scenarios (student A and student B) were constructed to implement the syllabus which will be used for evaluating the new device. Sample A stage and B stage scenarios are included as appendix B to this report. All scenarios were flown in the simulator prior to beginning the evaluation to ensure that they had face validity, could be controlled by the instructors, and could be accomplished in the allotted time.

FLIGHT SYLLABUS

The experimental flight syllabus (to be used for evaluating the training effectiveness of Device 2F64C) could not be developed until the performance of the control group had been analyzed and the CPT and OFT syllabi completed. Ideally, it should only contain those tasks that cannot be effectively trained in the CPT and OFT or that require training in the synthetic ground environment and in the aircraft. These criteria can only be partially satisfied when developing a flight syllabus for assessing the training effectiveness of a new flight simulator. In assessing the effectiveness of the new device, it is desirable to determine the transfer of training for each task from the simulator to the aircraft. Thus. tasks with expected high rates of transfer must be included in the experimental flight syllabus in order to verify that transfer does in fact occur. Those tasks with a demonstrated high rate of transfer (e.g., basic instruments) may be less prominently represented in the operational syllabus.

It is important to note that all tasks trained in the simulator cannot be verified in the aircraft. Obviously, tasks that cannot be trained safely in the aircraft such as power settling, blade stall, multiple engine failures, and tail rotor drive failures can be trained more safely and effectively in the new simulator than in the SH-3. Many of the malfunctions/emergencies trained in the OFT, such as main gear box or engine malfunctions, cannot be realistically simulated in the aircraft. Thus, in flight, the instructor is restricted to merely stating a condition or retarding a speed selector. To indicate an emergency in this manner considerably lessens the realism. Time, risk, and lack of realism do not allow the instructor to assess performance in the air for all the emergencies and malfunctions practiced in the CPT or OFT. The instructor must select those that best sample system knowledge, have the higher probability of occurrence, and can be effectively simulated in the air, such as ASE failures.

The experimental flight syllabus was developed using the same general guidelines established for the simulator syllabus. Tasks are introduced, practiced, tested, and refreshed.

SECTION IV

TRAINING EFFECTIVENESS EVALUATION OF DEVICE 2F54C

This section presents a plan[3] for a series of studies designed to assess the training effectiveness of Device 2F64C when it came on-line, ready-for-training. Four studies employing various combinations of motion and visual simulation are envisaged to measure the effectiveness of the new device (see table 1). With the simulator delivered as ready-for-training, three major areas of inquiry are of concern. They are:

- identifying tasks suitable for training in the simulator
- determining the amount of simulator training required for each task
- optimally mixing simulator and aircraft training.

The answers to these issues will be ascertained for the device when used with motion simulation and again when used without motion simulation. With the subsequent addition of visual simulation to the device, the same set of inquiries will be replicated for the various combinations of visual and motion simulation. The findings of these studies will provide guidelines for using the device in the event either visual and/or motion simulation are disabled for a protracted period of time. An additional payoff of the study program is the provision of data useful in decisions on future procurements concerning motion and visual simulation for helicopter simulators.

TABLE 1. PLAN FOR EVALUATING DEVICE 2F54C

	Control Group	Experimental Groups			
		I	II	III	IV
2C44 (CPT)	X	X	X	X	X
2F64C (OFT) with motion		X			
without motion			X		
with motion and visual*				X	
with visual but no motion*					X
SH-3 aircraft	X	X	X	X	X

*To be conducted after the addition of visual simulation.

[3]The plan was approved by CNO (OP-594) ltr ser 594/337392 of June 1979.

CONTROL GROUP TRAINING

As discussed earlier, control group data were collected during the period of this report to be used for subsequent comparisons with the experimental groups. Seventeen students were selected randomly from the scheduled 40 first-tour students trained each year. All were recent graduates of UPT and possessed standard instrument ratings.

Students in this group received training in 149 tasks in the CPT and SH-3 aircraft (see appendix C). Performance on each task trained was recorded as well as the amount of training time in each medium. Table 2 provides the training sequence and number of hours scheduled by medium. All training was in blocks of instruction in accordance with the sequence shown in the table.

TABLE 2. CONTROL GROUP TRAINING

Medium	Sessions	Hours
CPT (2C44)	7	14
SH-3 (A Stage)	6	15
SH-3 (B Stage)	8	20

DATA RECORDING. Grade cards were designed to record performance on the various tasks trained (see figure 2). A column for task codes for computer storage was later added. Only the columns on the right side of the grade sheet require an explanation. The headings of the first three columns on the right refer to the NATOPS grade assignment for task performance. The next two require no explanation. The last column is used to record the number of task trials (1's or P's) for tasks for which trial data are collected; for tasks where the column is shaded, an overall grade of P is recorded, if appropriate. Proficiency (P) is defined as that level of performance required to pass a NATOPS check for designation. For example, item 13 on the grade card (Normal Landings) may be graded by the instructor for each of five trials as 1, 1, P, 1, P. This indicates that the student performed to NATOPS standard on two of the five trials.

Grade cards were collected after each training session and checked for completeness. Total training times for each student in each block of instruction were calculated as well as the number of sessions not completed due to weather, maintenance, or other factors. The total trials received by task and the number of trials needed to achieve proficiency by each student were also calculated. An example of the method used for determining the point at which proficiency was achieved is shown below.

Task	Graded Trial Sequence	Number of Trials to Proficiency
Normal Start	111P1 P PPPP	6
Systems Check	11P11 P PPP1PP	6
Shutdown	11 P PPPP	3
Engine Fire	P1	-

HS-1 TRNG FORM REV. 2-79)

FRP ____________ AF-4/5/6X SIDE 1

INST ____________ SEAT: R

DATE ____________ TIME: 2.5

	QUALIFIED	COND QUALIFIED	UNQUALIFIED	DISCUSS	NOT OBS OR INTRO	NUMBER TRIALS/ PROFICIENCY TOTAL
1. NORMAL START (AF1-7-1), NATOPS SEC 3						
2. BLADE SPREAD (AF1-6-1), NATOF SEC 3						
3. SYSTEMS CHECKS (AF1-5-1), NATOPS SEC 3						
4. NO. 2 ENG START (AF1-4-1), NATOPS SEC 3						
5. ROTOR ENGAGEMENT (AF1-4-1), NATOPS SEC 3						
6. TAXI CHECKLIST (AF1-1-1), NATOPS SEC 3						
7. TAXI, NATOPS SEC 3						
8. PRE-TAKEOFF CHECKLIST (AF1-1-2), NATOPS SEC 3						
9. TAKEOFF CHECKLIST (AF1-1-2), NATOPS SEC 3						
10. RUNNING TAKEOFF, NATOPS SEC 3, HS-1 STAN FOR MAX GROSS T/O						
11. POST-TAKEOFF CHECKLIST (AF1-1-3), NATOPS SEC 3						
12. NORMAL APPS (RWY/PAD), NATOPS SEC 3						
13. NORMAL LANDINGS (RWY/PAD), NATOPS SEC 3						
14. ASE MALF (AF1-12-1), NATOPS SEC 5						
15. ASE OFF FLIGHT						
16. ASE OFF LANDINGS (PAD)						
17. SERVO MALF (AF1-14-1), NATOPS SEC 5						
18. AUX OFF FLIGHT						
19. AUX OFF LANDINGS						
20. SINGLE ENGINE MALF T/O ABORT (AF3-2), NATOPS SEC 5						
21. MANUAL THROTTLE TECHIQUES CK, NATOPS SEC 5						
22. SINGLE ENG APP (RWY) (AF3-1-1), NATOPS SEC 5						
23. SINGLE ENG LDGS (RWY) (AF3-1-1), NATOPS SEC 5						
24. SINGLE ENG APP (PAD) (AF3-1-1), NATOPS SEC 5						
25. SINGLE ENG LDGS (PAD) (AF3-1-1), NATOPS SEC 5						
26. SINGLE ENG WAVEOFF (AF3-1-2), NATOPS SEC 5						
27. COURSE RULES (AF1-9)						
28. PRACTICE AUTOROTATIONS (AF4-1-1), NATOPS SEC 3 (DEMO 100KT)						
29. RUN ON LANDINGS (AF2-1-1), NATOPS SEC 3						
30. CUT GUN IN 10' HOVER (DEMON ON AF-6)						
31. BEFORE LANDING CKLST (AF1-1-4), NATOPS SEC 3						
32. AFTER LANDING CKLST (AF1-1-4), NATOPS SEC 3						
33. SHUTDOWN, NATOPS SEC 3						
34. ROTOR DISENGAGEMENT, NATOPS SEC 3						
35. BLADE FOLD (AF1-6-2), NATOPS SEC 3						
36. NO. 1 ENG SECURE, NATOPS SEC 3						

Figure 2. Student Grade Sheet

HS-1 TRNG FORM REV. 1 (2-79) AF 4/5/6X SIDE 2	QUALIFIED	COND QUALIFIED	UNQUALIFIED	DISCUSS	NOT OBS OR INTRO	NUMBER TRIALS/ PROFICIENCY
37. POST-FLIGHT, NATOPS SEC 3						
DISCUSS: ROTOR BRAKE FAILURE; DYNAMIC TIPOVER; FLEX DRIVE SHAFT FAILURES						
PROOP STOP MALFUNCTION; SYSTEMS KNOWLEDGE; SELECTED						
EMERGENCY PROCEDURES						
BASIC AIRWORK						
COCKPIT PROCEDURE						
PREPARATION						
HEADWORK						
COMMENTS						

INSTRUCTOR'S SIGNATURE

Figure 2. Student Grade Sheet (continued)

The number of trials required to be judged proficient for the tasks "Normal Start" and "Systems Check" were six each. "Shutdown" was judged as three. Too few trials were attempted for "Engine Fire" to make a proficiency judgment.

RESULTS

Control group performance is shown in table 3 in terms of scheduled and actual sessions and the time required to complete each stage of training.

TABLE 3. SCHEDULED VERSUS ACTUAL SESSIONS FOR CONTROL GROUP (N=15)

	Scheduled Sessions	Scheduled Hours	Actual (Average) Sessions	Actual (Average) Hours
CPT (A stage)	7	14.0	8.1	15.4
SH-3 (A stage)	6	15.0	7.3	17.2
SH-3 (B stage)	8	20.0	10.5	26.3
Total	21	49.0	25.9	58.9

Note that the average number of sessions and the average number of hours required to complete each phase exceeded those scheduled. This is attributed to the failure of students to achieve proficiency and also to the need to reschedule sessions due to equipment failures or maintenance problems.

EFFECTS OF CONTROL GROUP DATA ON SYLLABUS DEVELOPMENT. The control group performance data provide indications of the amount of training required by the average student to achieve proficiency in each task. Tables 4 and 5 identify the most difficult tasks in the A and B in-flight stages. These data are representative of the data used in developing the experimental syllabi for assessing the training effectiveness of Device 2F64C.

TABLE 4. ORDER OF DIFFICULTY FOR A STAGE FLIGHT TRAINING TASKS

Task*	Average Number of Trials	Average Number of Trials to Proficiency
Normal Landings	26.4	13.4
Autorotation	17.9	13.4
Normal Takeoff	15.7	9.7
Normal Approach (Runway/Pad)	17.9	9.6
Run On Landing	13.3	8.4
ASE Off Landing	10.5	6.2
Single Engine Approach to Runway	8.7	5.6
Aux Off Landing	8.8	5.4
Running Takeoff	10.5	4.9
ASE Off Flight	7.9	3.9

*Only the 10 most difficult tasks are presented.

TABLE 5. ORDER OF DIFFICULTY FOR B STAGE FLIGHT TRAINING TASKS

Task*	Average Number of Trials	Average Number of Trials to Proficiency
Alternate Approach Pilot Procedures	15.4	10.5
Hover Departure Procedures	19.3	10.1
Free Stream Recovery	7.2	6.3
Sonar Deployment Voice Procedures	12.4	5.0
Auto Approach Pilot Procedures	12.7	4.0
Windline SAR Pilot Procedures (Rescue)	6.1	3.1
Instrument Takeoff	3.4	2.9
Alternate Approach Copilot/Voice Procedures	18.9	2.8
10 Foot Hover Swimmer Deployment	3.6	2.7
GCA	4.3	2.6
SAR Manual Approach	3.9	2.6

*Only the 11 most difficult tasks are presented.

The control group received training on 97 tasks in the SH-3 aircraft. The order of difficulty has been established for these tasks. It should be noted that the 10 most difficult A stage tasks listed in table 4 require the use of visual cues. It is expected that the maximum effectiveness of the new simulator for training these tasks cannot be realized until visual simulation is added. Only the 10 Foot Hover Swimmer Deployment and SAR Manual Approach tasks listed in table 5 for B stage require visual cues. Hopefully, the simulator without visual simulation will be effective for training the other 9 tasks.

DATA MANAGEMENT

Manually scheduling the large number of tasks for the appropriate amount of training is difficult and time consuming. To facilitate control of the syllabus and the monitoring of student performance, all tasks have been coded in accordance with NATOPS qualification grading areas. Student performance on each task will be entered into a computer data bank for analysis. Appendix D provides a listing of tasks trained by task code and a matrix of task codes displaying when and where each task is trained (CPT, OFT, or aircraft). The computer program will permit rapid analysis of each student's performance, within group comparisons, and group comparisons. The program will also facilitate syllabus revisions as required.

POST NOTE

The significant feature of this report is that it provides insights on the kinds of planning and preparation required for conducting a training effectiveness evaluation. This planning and preparation should be accomplished well in advance of a new flight simulator coming on line ready for training.

A number of initiatives are described which highlight the preparations. These initiatives utilize instructional development procedures and require subject matter expertise. The key items are the syllabi development for the simulator and for inflight training. This is followed by the arduous task of developing detailed simulator scenarios. These are crucial to the effective implementation of the syllabus designed to capitalize on the unique capabilities of the simulator. The scenarios ensure that instructors of varied levels of experience utilize the device in a standard way to train all the tasks in the syllabus. To these initiatives are added the experimental study plan, the performance measurement subsystem, and the control group training and data collection. While considerable time and energy are required in these accomplishments, the expected payoff is substantial.

The present report documents these preparations as the prelude to the onsite training effectiveness evaluation of Device 2F64C at HS 1. By recording these preparations prior to the actual evaluation, succeeding reports can focus directly on the evaluation and its implications for fleet readiness training. The report has additional features. It provides a methodological approach for individuals anticipating conduct of a device evaluation under similar circumstances. Finally, the report provides a "corporate memory" for succeeding personnel concerned with managing training.

Subsequent reports will document the results of the assessment of the training effectiveness of the new flight simulator in the HS 1 FRS program.

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Browning, R. F., Ryan, L. E., and Scott, P. G. Utilization of Device 2F87F OFT to Achieve Flight Hour Reductions in P-3 Fleet Replacement Pilot Training. TAEG Report No. 54. 1978. Training Analysis and Evaluation Group, Orlando, FL 32813 (AD A053650).

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APPENDIX A

PROCEDURES TRAINING AID

PROCEDURE TRAINING AID

SH-3D/H NORMAL START CHECKLIST

...A LEARNING PACKAGE FOR PILOTS IN TRAINING

TRAINING ANALYSIS AND EVALUATION GROUP
ORLANDO, FLORIDA 32813

RICHARD BRABY
PAUL SCOTT

OCTOBER 1980

NAVAIR 01-230HLH-1C

SH-3D/H NATOPS PILOTS' CHECKLIST

NORMAL PROCEDURES

This checklist superseded NAVAIR 01-230HLH-1C dated 1 March 1977 and NAVAIR 01-230HLE-1B dated 1 December 1975

NORMAL START

1. Circuit Breakers and Switches. . . . . CHECK
2. Fuel Dump Switches . . . . OFF
3. Brakes and Tailwheel . . . . .LOCKED
4. Battery Switch . . . . .ON
5. External Power . . . . CONNECTED
6. Battery Switch . . . . OFF
7. Landing Gear . . . . CHECK
8. Drop Tank Switch Panel(SH-3H). CHECK
9. Start Mode Switch. . . . . AS REQUIRED
10. Blade Panel(Radios SH-3D),Hoist, Trim. . . . . CHECK
11. Torquemotor Switches . . . . OFF
12. Anti-ice . . . . CHECK AS REQUIRED
13. Ignition Switches. . . . . .NORMAL
14. Accessory Drive Switch . . . . FORWARD, LIGHT ON
15. Manual Throttles, Speed Selectors. . . . . .FREE AND OFF
16. Emergency Start and Override Switches. . . . . OFF
17. Rotor Brake. .CHECKED(320 PSI MINIMUM)
18. Fire Warning, Caution, Advisory Panels . . . . CHECK
19. PMS Disable Switch(SH-3H). . . . . .PULL
20. Fuel Panel/Quantity. . . . . CHECK
21. Battery Switch . . . . .ON
22. Lights . . . . AS REQUIRED
23. No. 1 Engine . . . . START
24. All Gages. . . . . CHECK
25. Boost Pumps. . . . . OFF
26. Speed Selector . . . . 104% Nf
27. Generators . . . . .ON
28. No. 1 Overspeed System . . . . CHECK
29. External Power . . . . .DISCONNECTED
30. Compass System, Console Switches . . . . AS REQUIRED
31. RAD ALT, BAR ALT, RAWS .SET AND TEST
32. Servo Sensor . . . . CHECK

Extracted from NAVAIR 01-230HLH-1C

INTRODUCTION

Learning Objective	When you complete this package you will be able to: 1. describe each item in the NATOPS SH-3H Normal Start Checklist, using the checklist and the paper mock-up of the cockpit. 2. perform each item on the SH-3 Cockpit Procedures Trainer, without hesitation, error, or omission.
Why Learn This Procedure	NATOPS requires use of the Normal Start Checklist each time a normal No. 1 engine start is performed.
Resources Required	In addition to this booklet, you will need: 1. paper mock-up of the SH-3H cockpit. 2. NATOPS SH-3H Normal Start Checklist. 3. SH-3H Cockpit Procedures Trainer (used only in the final phase of lesson).
Cockpit Description	The SH-3H cockpit is divided into sections. Figure 1 shows the locations and names of the sections involved in the No. 1 Engine Normal Start Checklist.

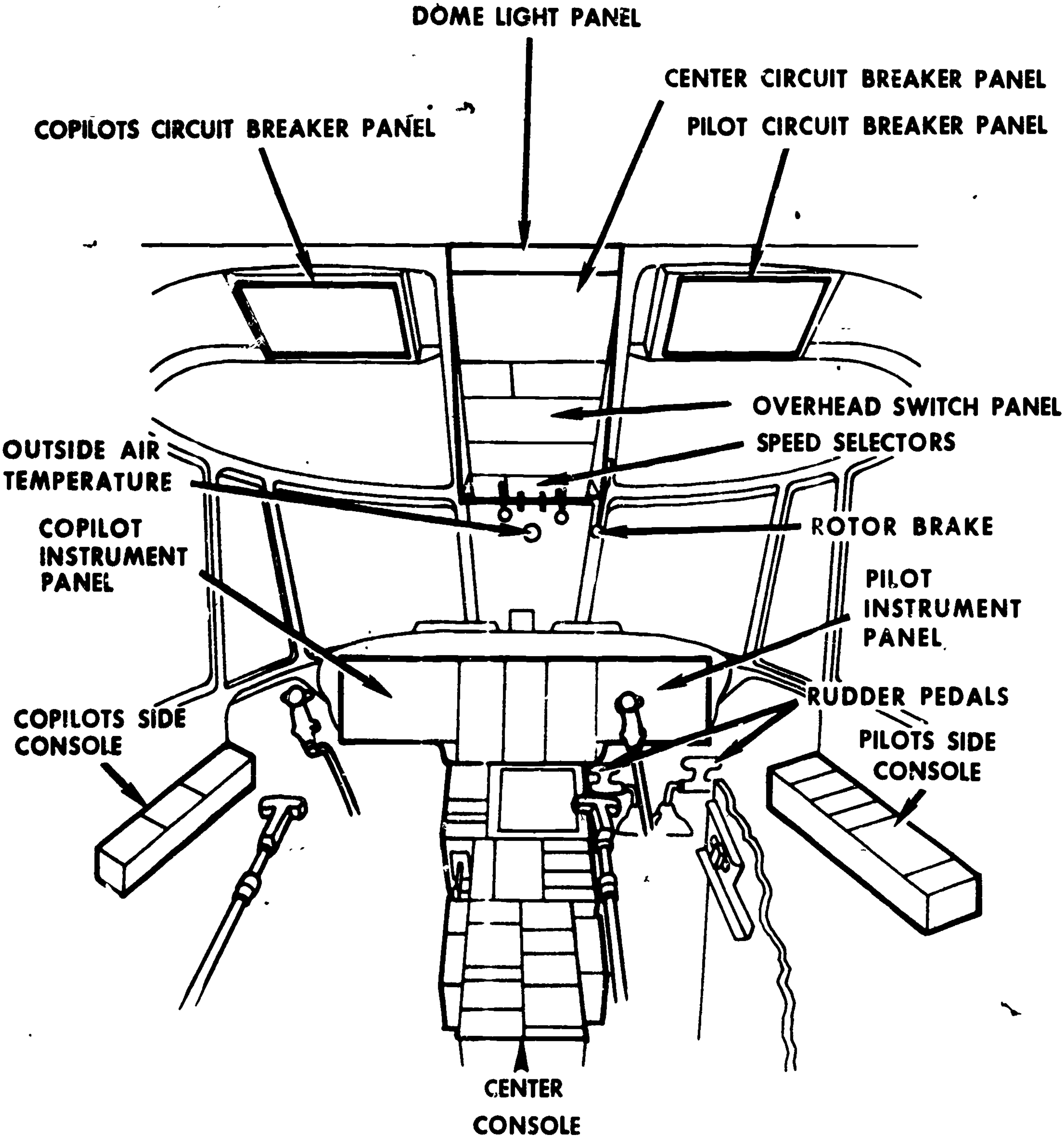

DOME LIGHT PANEL
CENTER CIRCUIT BREAKER PANEL
COPILOTS CIRCUIT BREAKER PANEL
PILOT CIRCUIT BREAKER PANEL
OVERHEAD SWITCH PANEL
SPEED SELECTORS
OUTSIDE AIR TEMPERATURE
ROTOR BRAKE
COPILOT INSTRUMENT PANEL
PILOT INSTRUMENT PANEL
RUDDER PEDALS
COPILOTS SIDE CONSOLE
PILOTS SIDE CONSOLE
CENTER CONSOLE

Figure 1

HOW TO USE LEARNING MATERIALS

Directions

1. This lesson will be presented in a way that may be new to you. The following information will help you in completing it quickly and easily.

   a. Each item in the NATOPS SH-3H Normal Start Checklist has been broken down into ACTION and RESULT steps.

   b. If the performance of an ACTION step causes the system to do something you can observe (e.g., light a lamp), what the system does will be presented as a RESULT step.

   c. If something can go wrong that requires corrective action by you, the symptoms and corrective action are described in an IF/THEN statement.

   d. In addition, CAUTIONS, WARNINGS, MEMORY AIDS, and NOTES are presented where appropriate.

   e. Each item in the checklist requires a VOICE RESPONSE when that item is completed.

2. Take your time and learn all of the steps of each item correctly and in sequence. The step boxes with directions are numbered. READ THEM IN ORDER and touch the locations on the paper mockup.

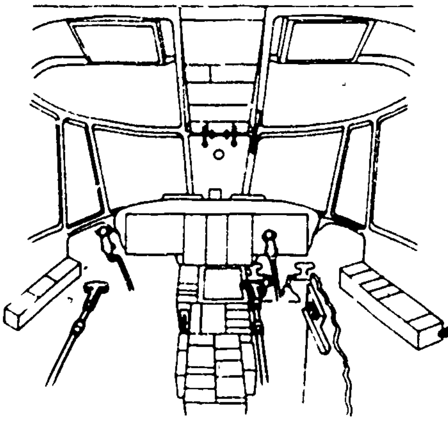
3. After each item you will be required to recall the ACTION and RESULT steps and the IF/THEN statements. You will also need to recall the CAUTIONS, WARNINGS, MEMORY AIDS, and NOTES and touch the locations on the paper mockup.

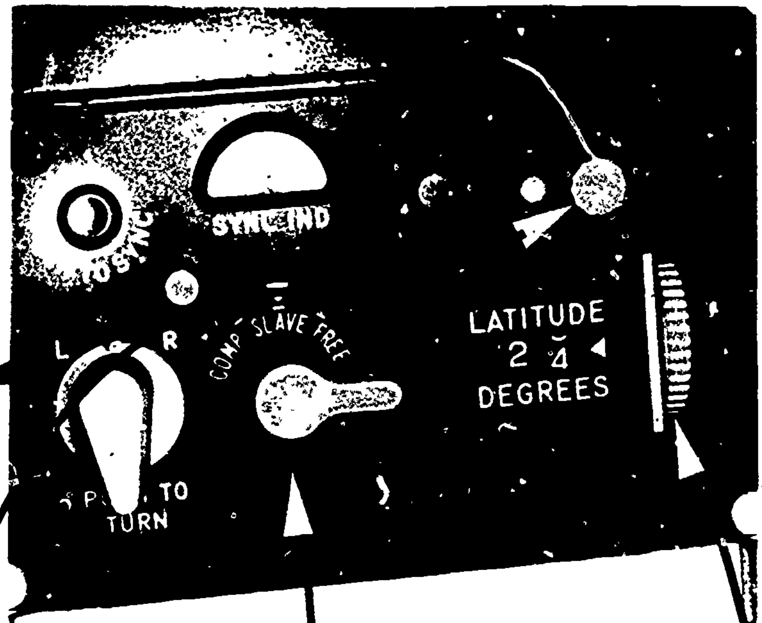
4. After each item state (verbalize) the VOICE RESPONSE.

5. For best results, follow all of the instructions.

NORMAL START CHECKLIST ITEM NO. 1. Circuit Breakers and Switches .... CHECK

Purpose: To verify that the circuit breakers are IN and switches are set as appropriate.





PILOT

1. Action

   Set Compass Control Mode switch to SLAVE

2. Action

   Set latitude to current position

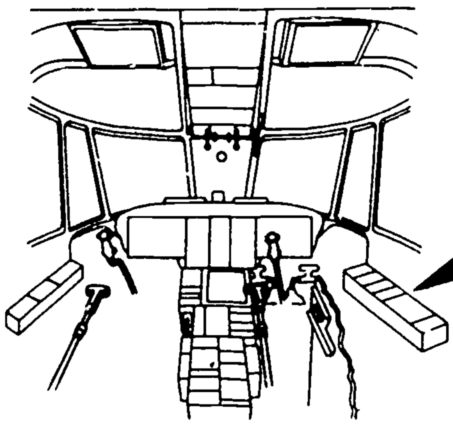
3. Action

   Set hemisphere to N or S as appropriate

GO TO PAPER MOCK-UP • STEP THROUGH ITEM • TOUCH WHERE EACH ACTION AND RESPONSE TAKES PLACE

NORMAL START CHECKLIST ITEM NO. 1. Circuit Breakers and Switches .... CHECK

Purpose: To verify that the circuit breakers are IN and switches are set as appropriate.



4. Action

   Set Meter Selector switch to ASE (counter clockwise)

5. Action

   Set Vertical Gyro switch to PORT (up)

6. Action

   Check 4 Hardover switches OFF (covers down)

7. Action

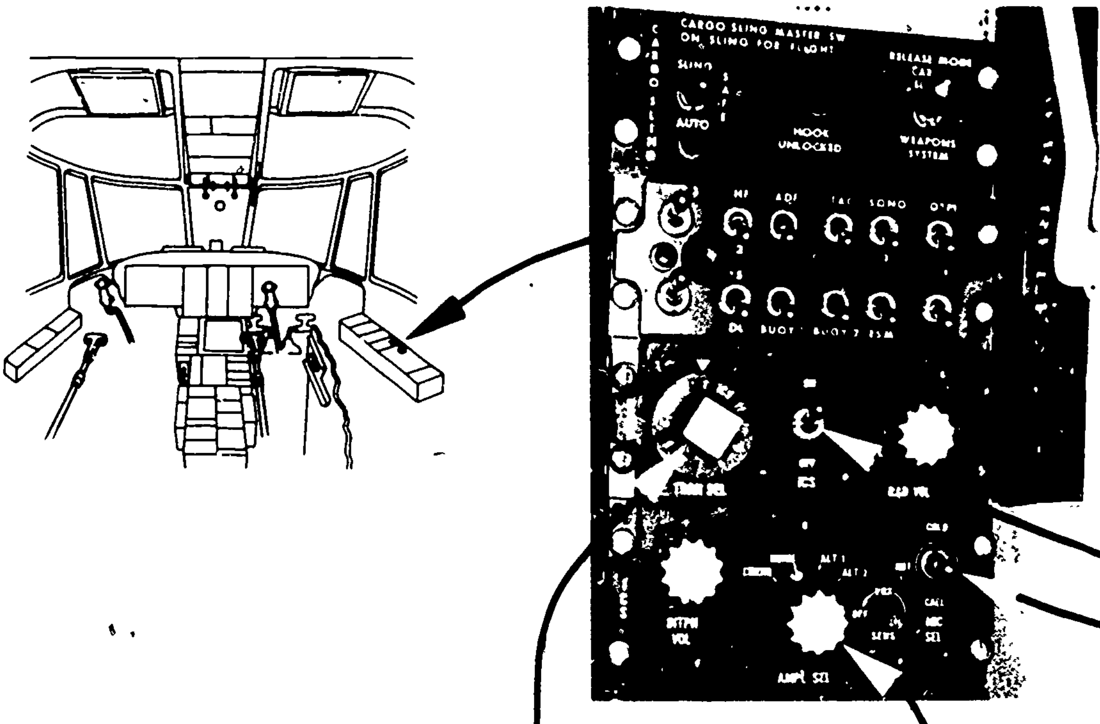
   Check 4 Channel Disconnect switches to ON (up)

GO TO PAPER MOCK-UP

NORMAL START CHECKLIST ITEM NO. 7. Circuit Breakers and Switches .... CHECK

Purpose:

> To verify that the circuit breakers are IN and switches are set as appropriate.



8. Action

   Set ICS AMPL SEL mode switch to NORM

9. Action

   Set ICS microphone selector switch to COLD

10. Action

    Set radio transmitter selector switch as desired, usually 1 or 4 (1 for UHF1, 4 for VHF2)

11. Action

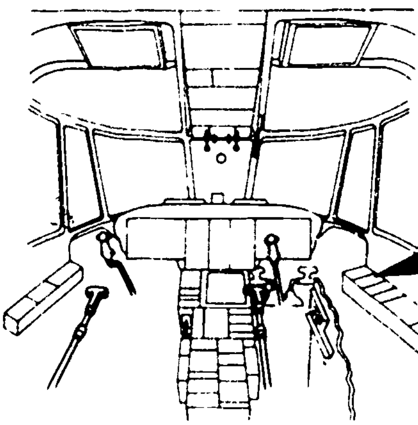
    Set ICS switch on RAD panel to ON

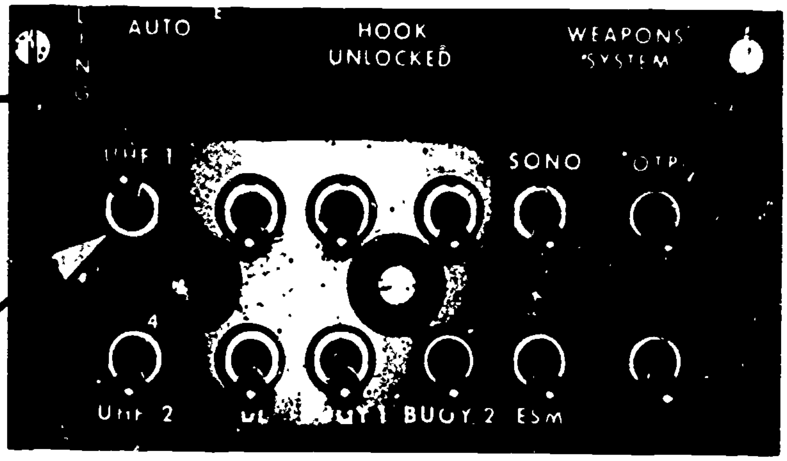
GO TO PAPER MOCK-UP ● PRACTICE ITEM ● KEEP PRACTICING UNTIL YOU RECALL WHAT TO DO WITHOUT HESITATING

NORMAL START CHECKLIST ITEM NO. 1. Circuit Breakers and Switches .... <u>CHECK</u>

Purpose:

To verify that the circuit breakers are IN and switches are set as appropriate.





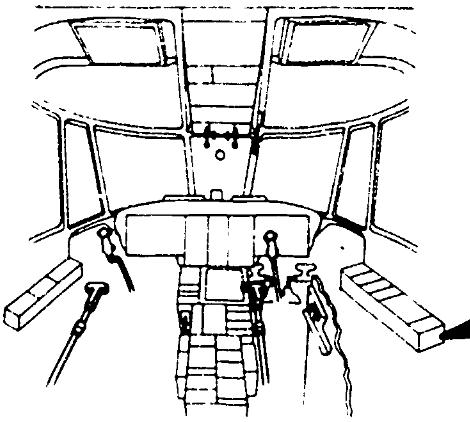
12. Action

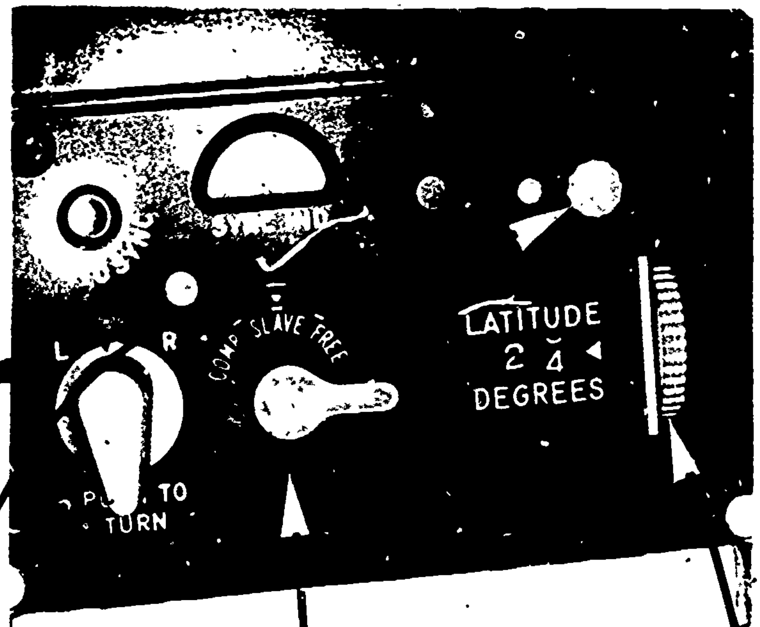
Set mixer switches as desired.
Usually UHF 1 to <u>ON</u> <u>(up)</u>

GO TO PAPER MOCK-UP ● PRACTICE ITEM ● KEEP PRACTICING UNTIL YOU RECALL WHAT TO DO WITHOUT HESITATING

NORMAL START CHECKLIST ITEM NO. 1. Circuit Breakers and Switches .... CHECK

EXERCISE ● FILL IN THE BLANKS ● WRITE ON SCRATCH PAPER – NOT THE BOOK ● REFER BACK TO CHECK YOUR ANSWERS





PILOT

1. Action

   Set Compass Control Mode switch to ______

2. Action

   Set latitude to ______ position

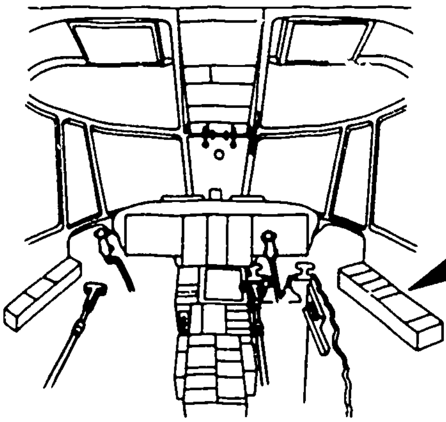
3. Action

   Set hemisphere to __ or __ as appropriate

AGAIN, GO TO PAPER MOCK-UP ● PRACTICE ITEM ● KEEP PRACTICING UNTIL YOU RECALL WHAT TO DO WITHOUT HESITATING

NORMAL START CHECKLIST ITEM NO. 1. Circuit Breakers and Switches .... CHECK

Purpose:



4. Action

   Set Meter Selector switch to ___ (_____ _______)

5. Action

   Set Vertical Gyro switch to ___ (__)

6. Action

   Check 4 Hardover switches ___ (covers ___)

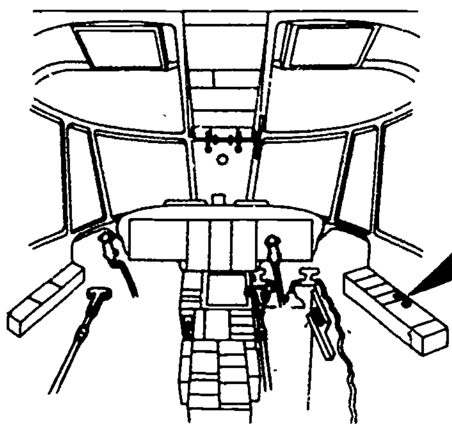
7. Action

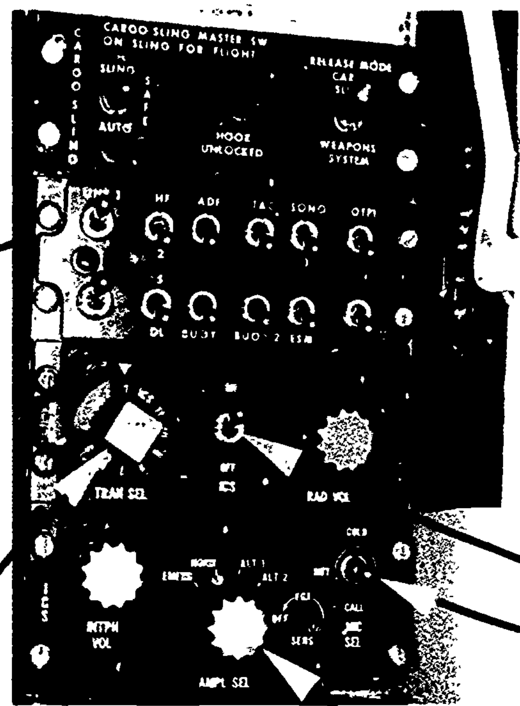
   Check 4 Channel Disconnect switches to ___ (__)

AGAIN, GO TO PAPER MOCK-UP ● PRACTICE ITEM ● KEEP PRACTICING ... RECALL WHAT TO DO WITHOUT HESITATION

NORMAL START CHECKLIST ITEM NO. 7. Circuit Breakers and Switches .... CHECK

Purpose:





8. Action

   Set ICS AMPL SEL mode switch to ____

9. Action

   Set ICS microphone selector switch to ____

10. Action

    Set radio transmitter selector switch as desired, usually __ or __ (1 for UHF1, 4 for VHF2)

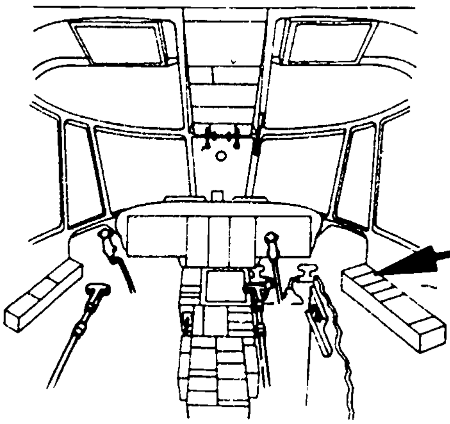
11. Action

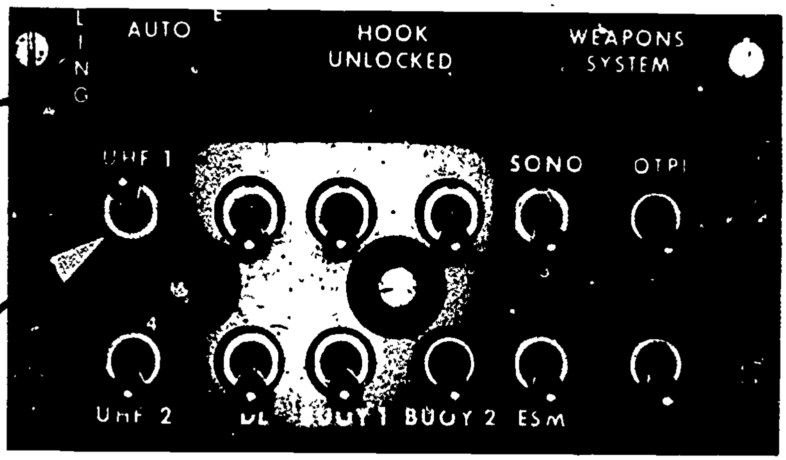
    Set ICS switch on RAD panel to __

GO TO PAPER MOCK-UP • STEP THROUGH ITEM • TOUCH WHERE EACH ACTION AND RESPONSE TAKES PLACE

NORMAL START CHECKLIST ITEM NO. 1. Circuit Breakers and Switches .... CHECK

Purpose:





12. Action

Set mixer switches as desired.
Usually UHF 1 to ___ (___)

AGAIN, GO TO PAPER MOCK-UP ● PRACTICE ITEM ● KEEP PRACTICING UNTIL YOU RECALL WHAT TO DO WITHOUT HESITATING

APPENDIX B

SAMPLE A AND B STAGE GRADE SHEETS AND SIMULATOR SCENARIOS

HS 1 (TAEG) TRAINING FORM REV. 1 (16 JUNE 80)
ASF-4

FRP ____________ COMP ________

INST ____________ INCOMP ________

DATE ____________ PILOT TIME ________ COPILOT TIME ________

COPILOT NAME ____________________

TASK CODE		QUALIFIED	COND QUALIFIED	UNQUALIFIED	DISCUSS, INTRO, NOT OBS	NUMBER TRIALS/ PROFICIENCY
AE100	NO. 2 ENGINE START					
BE201	MAX GROSS TAKEOFF					
BB100	INSTRUMENT DEPARTURE					
FJ700	HIGH SPEED FLIGHT					
FJ200	BLADE STALL (INTRO)					
FJ100	POWER SETTLING (INTRO)					
BE408	HOLDING					
BE402	TACAN APPROACH					
BE409	MISSED APPROACH					
CE500	SINGLE ENGINE MALFUNCTION ANALYSIS					
CB100	SINGLE ENGINE APPROACH RUNWAY (INTRO)					
CB300	SINGLE ENGINE APPROACH PAD (INTRO)					
CB200	SINGLE ENGINE LANDING RUNWAY (INTRO)					
CB400	SINGLE ENGINE LANDING PAD (INTRO)					
CB500	SINGLE ENGINE WAVEOFF (INTRO)					
CB600	SINGLE ENGINE MALFUNCTION TAKEOFF/ABORT (INTRO)					
CA100	AUTOROTATIONS (INTRO)					
BE600	RUN ON LANDING					
BE300	INSTRUMENT TAKEOFF					
BE404	ASR APPROACH					
BE500	NORMAL LANDING					
AG100	SHUTDOWN CHECKLIST					
AG200	ROTOR DISENGAGEMENT					
BA500	CHECKLISTS					
BG400	COMMUNICATIONS					
	MALFUNCTIONS/EMERGENCIES (GRADE IF GIVEN)					
FI772	ROTOR BRAKE CAUTION LIGHT					
FI795	BLADE DAMPNER FAILURE					
FD803/4	LUBE PUMP SHAFT FAILURE (803/804)					
FD815/6	ENGINE FIRE (815/816)					
FC782	MGB CHIP LITE					
FC777	IMMEDIATE LOSS OF MGB OIL PRESSURE					
FC786	TRANSMISSION OIL OVERHEAT					
FC775	TRANSMISSION SYSTEM FAILURES (776 TO 789)					
FE798	TAIL ROTOR CONTROL LOSS (INTRO)					

HS 1 (TAEG) TRAINING FORM REV.1 (16 JUNE 80)
ASF-4
SIDE 2

TASK CODE		QUALIFIED	COND. QUALIFIED	UNQUALIFIED	NUMBER, INITIALS/ PROFICIENCY
FD839/40	AXIAL SHAFT FAILURE (.839/.840)				
FD807/8	IMMEDIATE OIL PRESSURE LOSS (.807/.808)				
FD811/2	HIGH OIL TEMP (.811/.812)				
FA973	FIRE EXTINGUISHER C.B.				

COCKPIT PROCEDURE				
PREPARATION				
HEADWORK				
DISCUSS COMMUNICATIONS FAILURES, POWER SETTLING, BLADE STALL				
SYSTEMS KNOWLEDGE:				

TRANSMISSION SYSTEM, ENGINE EMERGENCIES, SHUTDOWN
FIRE

TASK CODE	TASK COMMENTS

	TRAINING OFFICER REVIEW
INSTRUCTOR SIGNATURE	SIGNATURE

Initial Conditions (IC)

IC 4

CRT
PAGE 10

PARAMETER CHANGE/MONITOR PAGE

CODE		VALUE
	AIRCRAFT/PARAMETERS	
.10	Position (+N-S) (Ø-15Ø NM)	-74.9
.11	Position (+E-W) (Ø-15Ø NM)	15.9
.12	Altitude (Ø - 12ØØØ FT MSL)	18
.13	Heading (DEG, MAG)	27Ø
.14	Gross Weight (21ØØØ LBS MAX)	20,998
.15	Long Ctr of Gravity (IN) (258 276)	266
	ENVIRONMENT PARAMETERS	
.20	Baro Pressure (29 - 31 IN HG)	29.92
.21	Field Temp (-3Ø to +5Ø DEG C)	35
.22	Wind Direction from (DEG, MAG)	240
.23	Wind Speed (Ø - 5Ø KTS)	6
.24	Gust Amplitude (KTS)	Ø
.25	Sound Simulation (%)	25
.26	Vibration Level (%)	5Ø
.27	Sea State (Ø-5)	2

LT THROTTLE POSITION ERROR -79

RT THROTTLE POSITION ERROR - 2

ALT		UHF 1
V VEL	Ø	UHF 2
HEADING		HF
R TAC	1	TACAN
B TAC	268	LF/ADF
R NDB		IFF
B NDB		
TORQUE		
BNK ANG		

IC 4

CRT
PAGE 15

AIRCRAFT WEIGHT AND BALANCE

CODE		VALUE
.10	Sensor Operator (Ø/1/2)	2
	Fuel	
.11	Fwd Tank	2359
.12	Ctr Tank	1ØØ6
.13	Aft Tank	24ØØ
	Cargo	
.14	External	Ø
.15	Internal	7ØØ
	Stores	
.16	B-57 Depth Bomb (LF/RF)	Ø
.17	MK-44 Torpedo (LF/RF)	Ø
.18	MK-46 Torpedo (LF/RF)	Ø
.19	AN/ALE-37 Chaff (LA/RA)	Ø
.20	AN/ASQ-81 (V) - 2 MAD	Ø
.21	Smoke Marker Launcher (2)	2
.22	MK-15 Marine Marker (24)	24

Tube Loaded Sonobouys

CODE		TYPE	CODE		TYPE
.31	Tube No. 1	Ø	.37	Tube No. 7	Ø
.32	Tube No. 2	Ø	.38	Tube No. 8	Ø
.33	Tube No. 3	Ø	.39	Tube No. 9	Ø
.34	Tube No. 4	Ø	.4Ø	Tube No. 1Ø	Ø
.35	Tube No. 5	Ø	.41	Tube No. 11	Ø
.36	Tube No. 6	Ø	.42	Tube No. 12	Ø

41 = SSQ-41 5Ø = SSQ-5Ø 62 = SSQ-62
47 = SSQ-47 53 = SSQ-53 72 = SSQ-72

PRESENT TOTAL WEIGHT (21ØØØ LBS MAX)
PRESENT CG. STATION (258 to 276)

ALT		R NDB	
V VEL		TORQUE	
AIRSPEED	0	BNK ANG	
HEADING	270	No. 1 ENG	ON
R TAC	1	No. 2 ENG	OFF
B TAC	269	BLADES	SPREAD

SPECIAL BRIEFING ITEMS FOR THIS FLIGHT

1. Aircraft/Simulator Start

   a. Interior and exterior preflight inspections--complete
   b. Aircraft has flown previously today; this will be a hot seat change of pilots with systems checks complete
   c. Complete all checklists applicable for this flight.

2. Communications

Make all applicable radio calls. The call sign of today's aircraft is "ALPHA ROMEO ____."

3. Taxi, Takeoff, and Flight

   a. Taxi
   b. Takeoff (high gross weight, high temperature)
   c. Tasks to be trained or maneuvers to be performed on this flight.

4. Flight Publications Required

En route Low Altitude Charts 19/20
Vol. 9, Low Altitude Instrument Approach Procedures, S.E.
IFR and VFR Supplements
Jacksonville Sectional Chart

FREQUENCIES THAT MAY BE REQUIRED ON THIS FLIGHT

Frequency and Channelization card.

2F64C (SH-3) Scenario
Developed by TAEG
ASF-4 Page 2 of 15
Revision Date 25 August 1981

ASF-4 SIMULATOR SCENARIO, STUDENT NO. 1

1. Simulator setup:

a. Check safety mat free of objects, ramp and walkway clear
b. Lower safety bar and close door
c. Raise ramp and ensure UP light illuminated
d. Students--briefed on EMERGENCY EGRESS FROM TRAINER
e. Safety belts fastened
f. Master power, trainer power, and freeze lights illuminated
g. MAT, DOOR, HI TEMP, LOW OIL, GATE, and RAMP indicator lights out
h. Motion--ON
i. Ensure all systems are ON and rotor brake is ON.

2. Initiate problem with No. 1 engine running, blades spread, and systems check complete. Prepare for malfunction on rotor engagement. SELECT IC No. 4 and enter.

a. Freeze--OFF
b. Start No. 2 engine; complete checklist
c. Enter (.794), blade out of track
d. Clear malfunction and complete engagement after action on malfunction.

3. Before Taxi:

Call sign for today is "ALPHA ROMEO _____."

a. Contact Clearance Delivery

(1) If clearance previously filed, "Navy JAX Clearance Delivery ALPHA ROMEO _____, NIP 32 to Mayport." If not, include ETD, ETE and Wx Brief number.

(2) "ALPHA ROMEO _____, Navy JAX Clearance Delivery, clearance on request."

b. Taxi Checklist

(1) "ALPHA ROMEO _____, Navy JAX Clearance Delivery, advise when ready to copy clearance."

(2) "Navy JAX Clearance Delivery, ALPHA ROMEO _____, ready to copy."

(3) "ATC clears ALPHA ROMEO _____, as filed. After takeoff, maintain Rwy Head; climb to 2,000. One West of Navy JAX turn right to heading 360. Expect 4,000, 10 minutes after departure. Contact Departure Control on frequency 351.8, Squawk Mode 3, Code 0401. Readback."

2F64C (SH-3) Scenario
Developed by TAEG
ASF-4 Page 3 of 15
Revision Date 25 August 1981

(4) Readback

(5) "ALPHA ROMEO _____, readback correct; contact Navy JAX ground control when ready to taxi."

c. Taxi Clearance

(1) "Navy JAX Ground Control, ALPHA ROMEO _____, taxi, IFR to Mayport."

(2) "ALPHA ROMEO _____, Navy JAX Ground Control cleared to taxi to and hold short of Runway 27. Wind 240/6 knots, altimeter 29.92. Over."

(3) "ALPHA ROMEO _____."

4. Before Takeoff:

a. Instructor/student brief
b. Pre-Takeoff Checklist
c. Takeoff Checklist
d. Request Takeoff Clearance.

(1) "Navy JAX Tower ALPHA ROMEO _____, ready for takeoff, IFR to Mayport."

(2) "ALPHA ROMEO _____, begin assigned Squawk, cleared for takeoff, maintain runway heading after takeoff, wind 240/5 knots, switch to Jacksonville Departure Control on 351.8."

5. Max Gross Running Takeoff IFR:

Contact Departure and complete Post-Takeoff Checklist.

a. "Jacksonville Departure, Navy Copter ALPHA ROMEO _____, off Navy JAX climbing to 2,000."

b. "ALPHA ROMEO _____, radar contact, turn right to 360 and report reaching 2,000."

c. Report 2,000 feet.

d. "Roger ALPHA ROMEO _____, turn right to 060, climb to and maintain 4,000 "

e. Acknowledge.

2F64C (SH-3) Scenario
Developed by TAEG
ASF-4 Page 4 of 15
Revision Date 25 August 1981

6. Instructor establish conditions to demonstrate onset of blade stall or use DEMO No. 1.

a. At onset of blade stall have student recover. Freeze trainer if necessary to prevent loss of control.

b. Establish controlled flight.

c. If DEMO used: Press DEMO switch. (Note segment light will illuminate and show a "0" if a briefing is available or a "1" if demonstration maneuver only is available.)

7. Power Settling.

a. Establish flight conditions that could lead to power settling and recovery. Press FREEZE. At Select Digi Switches, enter DEMO 9 for power settling demonstration.

b. At conclusion of Demo, trainer should freeze and return to position prior to Demo.

c. Establish normal flight en route to PARNEL. Reduce gross weight to 19,000 lbs and temperature to 15^{0}. (Notify student.)

d. Establish normal flight en route to PARNEL.

8. Clearance to PARNEL.

a. "ALPHA ROMEO _____, cleared direct to PARNEL. Enter published holding. Maintain 4,000. Expect approach clearance at ______. Over."

b. "ALPHA ROMEO _____."

c. "Jacksonville Approach, ALPHA ROMEO ____ at 4,000."

d. "ALPHA ROMEO ____, Jacksonville Approach, Radar temporarily out of service. Report established in holding at PARNEL."

e. Report PARNEL.

f. "ALPHA ROMEO ____, JAX Approach, descend to and maintain 2,000."

g. "Jacksonville Approach, ALPHA ROMEO ____, out of 4,000 for 2,000."

9. Holding and Approach. Allow student to enter holding and make at least one pattern with clearance on second inbound, time permitting. (Mayport Approach Map.)

2F64C (SH-3) Scenario
Developed by TAEG
ASF-4 Page 5 of 15
Revision Date 25 August 1981

Approach Clearance

a. "ALPHA ROMEO ____ is cleared for a TACAN 22 approach to Mayport. Mayport reporting 500 broken, 2 miles visibility, wind 210/7 knots, altimeter 29.94. Contact Mayport tower on frequency 265.8 at the 4 mile DME on final approach."

b. Acknowledge and complete Before Landing Checklist.

c. Contact Mayport at 4 DME.

d. "ALPHA ROMEO ____, wind 210/6 knots, cleared to land RWY 22, check landing gear down and locked."

e. Acknowledge.

10. At minimums advise student that field is not in sight. He should execute a missed approach.

a. "Mayport Tower, ALPHA ROMEO ____, missed approach, request clearance to Jacksonville Approach."

b. "ALPHA ROMEO ____, contact Jacksonville Approach on 381.5."

c. Acknowledge and contact JAX.

d. "ALPHA ROMEO ____, left turn to intercept the 075 radial of Mayport, cleared to PARNEL. Over."

e. Acknowledge.

f. "JAX approach, ALPHA ROMEO ____, cancel my IFR at this time."

g. Freeze Trainer. Show student track on CRT or print copy for debrief.

11. Single Engine Malfunction Analysis:

a. Select a malfunction that will cause engine failure or require the student to shut the engine down such as Lube Pump Shaft Failure (.803/.804) or engine fire (.815/.816). For delayed malfunction use number preceded by a minus (-) instead of a point (.).

b. Enter. If delayed malfunction press MALF's INSERT switch.

c. Single Engine Checklist.

12. Single Engine Operations:

Landing Clearance

a. "Mayport Tower, ALPHA ROMEO, ____ miles East of Mayport at ____ft. Lost No. ___ engine, request landing and emergency equipment standing by."

b. "ALPHA ROMEO _____, Mayport Tower, cleared to land Runway 22 or Pad 2; wind 200/7 knots, altimeter 29.93. Report channel entry with gear."

c. Complete landing checklist and single engine landing approach.

13. Single engine waveoff:.

a. At an appropriate time before touchdown, instructor direct waveoff, continue around for another approach to touchdown. If additional approaches are needed reset trainer to pattern altitude for another approach (IC ___).

b. After Landing Checklist, as required, preparatory for the next takeoff. Delete all previous malfunctions.

14. Single Engine Malfunction on Takeoff/Abort:

a. Call up .839/.840 for axial shaft failure which will cause flameout when activated.

b. Complete Pre-Takeoff and Takeoff Checklists as required.

c. Begin Takeoff.

d. Enter malfunction unless delayed malfunction procedure has been entered, then press MALF INSERT.

e. Upon completion of abort.. Freeze the trainer and reset to inflight at Mayport. (IC-8)

15. Main Gear Box Malfunctions. Select MGB Chip Light (.782), immediate loss of transmission oil pressure (.777), or transmission oil overheat (.786).

a. Enter malfunction code.

b. After required malfunction action is completed and checklist completed, delete malfunction by punching in Malfunction Override.

16. Normal Takeoffs and Landings. At least three.

17. Autorotations. Position aircraft for autorotations at Mayport or assume autorotation at night on instruments. Recommend demonstration No. 2.

a. Press Freeze. At Select Digi Switches, enter 2 for demonstration.

(1) Press DEMO switch. (Note: segment light will illuminate and show a "0" if a briefing is available or a "1" if demonstration maneuver only is available.)

(2) Press Freeze and briefing will begin. Upon completion of briefing,

(3) Press Freeze and demonstration will begin.

b. At conclusion of Demo, trainer should freeze and return to position prior to Demo.

18. Autorotation should be practiced to the ground. The student is being trained to cope with an emergency, not for practice in power recoveries.

Reset to appropriate altitude for subsequent practice. At least one dual engine failure should be given. Malfunctions .839 and .840 if given simultaneously should set up condition to flameout both engines. Altitude can be varied from 500 feet up in accordance with student performance. Caution: recommend that not more than 5 or 6 be given without a significant break to do other type training. After practicing autorotations resulting from malfunctions, practice autorotations with power recovery.

19. Run On Landing. Have student do one or more run on landings at Mayport. Upon completion of this practice interrupt for change of students.

20. Landing:

a. After landing checklist
b. Refueling in accordance with hot seat procedures. (Perform hand signals)
c. Shutdown No. 2
d. Freeze for change of pilots.

21. Simulator Shutdown:

a. Freeze--PRESSED
b. Motion--PRESSED, light extinguished
c. Lower RAMP--Down light illuminated
d. Unlatch and raise safety bar.

ASF-4 SIMULATOR SCENARIO, STUDENT NO. 2

1. Simulator setup:

   a. Check safety mat free of objects, ramp and walkway clear
   b. Lower safety bar and close door
   c. Raise ramp and ensure UP light illuminated
   d. Students briefed on EMERGENCY EGRESS FROM TRAINER
   e. Safety belts fastened
   f. Master power, trainer power, and freeze lights illuminated
   g. MAT, DOOR, HI TEMP, LOW OIL, GATE, and RAMP indicator lights out
   h. Motion--ON
   i. Ensure all systems are ON and rotor brake is ON
   j. Initiate problem with No. 1 engine running, blades spread, and systems check complete. Verify internal cargo to 700; crewmen to 2; fuel 2359 Fwd, 1006 Center, AFT 2400 (gross should be about 21,000) Temp to 35°C.

2. All other conditions remain the same. Select malfunction. Blade dampner failure (.795).

   a. Freeze--OFF
   b. Start Engine No. 2
   c. Enter Malfunction selected
   d. Clear malfunction and complete engagement.

3. Before taxi:

   a. Taxi Checklist
   b. Taxi Clearance.

4. Before takeoff:

   a. Pre-takeoff Checklist
   b. Takeoff Checklist
   c. Instructor brief on Max Gross Takeoff Procedure, high speed flight and blade stall.

5. Takeoff:

   Takeoff Clearance

   a. "Mayport Tower, ALPHA ROMEO ____, ready for takeoff; request JAX 1 departure."

   b. "ALPHA ROMEO _____, cleared to lift, right turn after takeoff, JAX 1 departure approved. Wind 240/8, altimeter 29.92."

2 64C (SH-3) Scenario
Developed by TAEG
ASF-4 Page 9 of 15
Revision Date: 25 August 1981

c. Takeoff

d. Post-Takeoff Checklist.

6. High Speed Flight

Continue until onset of blade stall; if stall occurs and student is unable to recover, freeze the trainer.

7. Power Settling. Demonstration mode can be used or instructor can allow student to perform. If Demo used, refer to procedure used for first student.

a. Instructor establish conditions to induce power settling. After recovery or freeze, reduce gross weight to 19,000 and temperature to 15°C. (Notify student.)

b. Establish normal flight.

8. Call up malfunction that will lead to single engine operation: Lube Pump Shaft (.803/.804), engine fire (.815/.816), or immediate loss of oil pressure (.807/.808) and high oil temp (.811/.812).

9. Single Engine Malfunction Analysis:

a. Enter malfunction selected
b. Single engine checklist.

10. Single Engine Operations:

a. Landing clearance for Mayport
b. Landing Checklist
c. Single engine missed approach
d. Single engine landing
e. Reset to final approach if additional landing practice required.

11. Single Engine Malfunction Takeoff/Abort. Call up .839 or .840 for flameout.

a. Brief for takeoff
b. Complete checklists and request takeoff
c. Begin takeoff
d. Enter malfunction.

12. After aborted takeoff, freeze, clear malfunction and reset for another takeoff at Mayport. Practice a minimum of 3 Normal Takeoffs and Landings.

13. Main Gear Box Malfunction. Call up Transmission Malfunction (.776 to .789); identify malfunction given on grade card.

a. Enter malfunction, after completion of required action and completion of checklist

b. Clear malfunction.

14. Tail Rotor Control Loss. Call up rotor control cable loss (.798).

Complete recovery with landing.

15. Autorotations. Practice autorotations to ground at Mayport; at least one should be induced by malfunctions such as dual engine failure (.839 and .840). Use IC 17 for reset to 800.

16. Instrument Takeoff and Departure.

a. Pre-Takeoff and Takeoff Checklists

b. IFR Mayport to NAS Jacksonville for TACAN Approach to NAS Jacksonville.

(1) "Mayport Ground Control, ALPHA ROMEO_____, IFR to Navy Jax, request clearance."

(2) "ATC clears ALPHA ROMEO_____ to Navy Jacksonville as filed. Climb runway heading to 1,000, right turn to 240°, climb to 3,000. Contact Jacksonville Departure Control on 322.4, Squawk Mode 3, Code 0402. Readback."

(3) Readback

(4) "Readback correct. Contact Mayport Tower on 265.8 when ready for takeoff."

17. Takeoff:

a. "Mayport Tower, ALPHA ROMEO _____ ready for takeoff IFR to Navy Jax."

b. "ALPHA ROMEO _____ cleared to lift; begin Squawk, winds 220/10 knots, contact Jacksonville Departure on 322.4."

18. After Takeoff:

a. Contact Jacksonville Departure

(1) "Jacksonville Departure, Navy Copter ALPHA ROMEO _____, off Mayport maintaining runway heading."

(2) "ALPHA ROMEO _____ this is Jacksonville Departure, radar contact, turn right to 240°, maintain 3,000."

(3) "ALPHA ROMEO ___."

b. Post-Takeoff Checklist.

19. En route discuss communications failures.

20. Terminal Procedures

a. "ALPHA ROMEO _____ this is Jacksonville Departure, contact Jacksonville Approach on 284.6. Over."

b. "Jacksonville Approach, ALPHA ROMEO _____ at 3,000."

(1) "ALPHA ROMEO _____ this is Jacksonville Approach, cleared to MANDARIN via radar vectors, maintain 3,000, expect further clearance at _____."

(2) "ALPHA ROMEO _____."

(3) "ALPHA ROMEO _____, JAX Approach, Navy JAX weather 500 overcast, 1 mile visibility, wind 180/10, altimeter 29.92. Landing Runway 9."

c. Vector student to MANDARIN, check entry into holding pattern, time and procedures, wind corrections and preparation for a TACAN Approach. Landing Checklist.

(1) "ALPHA ROMEO _____ cleared for TACAN 9 to Navy JAX, report leaving MANDARIN and 3,000."

(2) "Jacksonville Approach, ALPHA ROMEO _____, leaving MANDARIN and out of 3000."

(3) At 6 mile arc, "ALPHA ROMEO _____, contact Navy JAX RADAR on frequency 374.8."

(4) "ALPHA ROMEO _____."

(5) "Navy JAX RADAR, ALPHA ROMEO _____."

(6) "ALPHA ROMEO _____, Navy JAX RADAR, Radar contact _____ miles, report 5 mile DME."

(7) "ALPHA ROMEO _____."

(8) "Navy JAX RADAR, ALPHA ROMEO _____, at 5 mi DME inbound."

(9) "ALPHA ROMEO _____, Navy JAX RADAR, continue approach, expect further clearance at 3 miles."

(10) At miles, "ALPHA ROMEO _____, you are cleared to land, wind 180/10."

(11) "ALPHA ROMEO _____."

21. Instructor. At minimums do not call field in sight; have student execute missed approach.

Missed approach

a. "Navy JAX RADAR, ALPHA ROMEO _____, executing missed approach, request ASR approach to Navy JAX."

b. "ALPHA ROMEO _____, contact Jacksonville approach this frequency."

c. Acknowledge

d. "Jacksonville Approach, ALPHA ROMEO _____, missed approach to Navy Jax request ASR approach."

e. "ALPHA ROMEO _____, turn right, climb to 1,600 on the 185 radial of Navy Jacksonville TACAN." Instructor vector for base leg to Runway 27 then

f. "ALPHA ROMEO _____, JAX Approach, contact Navy Jax Radar this frequency for ASR approach."

g. "Navy JAX RADAR, ALPHA ROMEO _____."

22. Instructor. Direct ASR Approach in the following manner. Bring up JAX Approach Map for vectors to final and then GCA Map for Runway 27. Instructor will be required to issue commands as steering commands for an ASR are not issued by computer.

a. "ALPHA ROMEO ____, Radar contact ____ miles ____ of Navy JAX."

b. "This will be a surveillance approach to Runway 27. What are your landing intentions?"

c. "Navy JAX GCA, ALPHA ROMEO ____, this will be a final landing."

(1) "ALPHA ROMEO ____, Navy Jacksonville weather ceiling 500 overcast, 1 mile visibility, wind 180/10, altimeter 29.92."

(2) "ALPHA ROMEO ____, your missed approach procedure is climb and maintain 1,600, 1 mile west of Navy JAX TACAN turn left heading 170°."

d. On downwind or base leg, call for landing checklist.

"ALPHA ROMEO ____, perform landing checklist."

2F64C (SH-3) Scenario
Developed by TAEG
ASF-4 Page 13 of 15
Revision Date: 25 August 1981

e. After turn on final

(1) "ALPHA ROMEO ____ this is your final controller, wheels should be down. Over."

(2) Acknowledge wheels down and locked and request recommended altitudes during the approach.

f. At 6-1/3 miles issue

(1) "ALPHA ROMEO ____ 6-1/3 miles from runway, prepare to descend in 1 mile, minimum descent altitude 480. Report runway in sight."

(2) "Five miles from runway, your altitude should be 1,520."

g. Issue altitude information in accordance with the following at

4 miles - 1,220
3 miles - 920
2 miles - 620

h. As required, "Heading _____, _____ miles from runway." At least once each mile, "Altitude should be _____."

i. On course or slightly left/right of course, and trend information as appropriate.

j. At 2½ miles, "_____ miles from runway, wind _____ at _____, cleared to land."

k. "1 mile from runway, take over visually; if runway/runway lights/ approach lights not in sight, execute missed approach. Over."

23. Upon completion of ASR approach and Run on landing, clear aircraft to shutdown in present position.

"ALPHA ROMEO _____, cleared to shutdown in present position. Winds 240/8."

24. After landing checklist:

Engine Fire No. 1 on ground (.815)

a. Enter .815
b. Fire extinguisher circuit breaker (.973)
c. Enter .973.

25. Simulator Shutdown. Perform the following:

a. Freeze--ON
b. Motion Switch--Pressed, light extinguished
c. Lower Ramp--DOWN light illuminated
d. Unlatch and raise safety bar. Stow in up position.

HS 1 (TAEG) TRAINING FORM REV. 2 (11 DEC 80) PCF-3

FRP ____________ COMP ________

INST ____________ INCOMP ________

DATE ____________ PILOT TIME ________ COPILOT TIME ____________

COPILOT NAME ____________________

TASK CODE		QUALIFIED	COMD QUALIFIED	UNQUALIFIED	DISCUSS. INTRO. NOT OBS	NUMBER TRIALS/ PROFICIENCY
DA100	TAC NAV CHECK					
DA200	COUPLER DOPPLER CHECK					
BG500	NITE LIGHTING PROCEDURE					
BE300	INSTRUMENT TAKEOFF					
BB100	INSTRUMENT DEPARTURE					
DA300	PRE-DIP CHECKLIST					
DB100	AUTO APPROACH PILOT PROCEDURES					
DC100	ALTERNATE APPROACH PILOT PROCEDURES (INTRO)					
DC200	ALTERNATE APPROACH COPILOT PROCEDURES					
DB300	HOVER DEPARTURE PROCEDURES					
DA500	SONAR DEPLOYMENT VOICE PROCEDURES					
DF100	USE OF CABLE ALTITUDE (INTRO)					
DE100	FREESTREAM RECOVERY					
EB100	IFR SAR SCENARIO DEMO					
BE402	TACAN APPROACH					
BE409	MISSED APPROACH					
BE403	GCA APPROACH					
CE300	MANUAL THROTTLE					
BA500	CHECKLISTS					
CE500	SINGLE ENGINE MALFUNCTION ANALYSIS					
	MALFUNCTIONS/EMERGENCIES (GRADE IF GIVEN)					
FA756	ELECTRICAL FIRE					
DE912	BEEPER TRIM FAILURE					
FD845/846	FUEL CONTROL CONTAMINATION					
FB878	ASE MALFUNCTION (.879 TO .880)					
DE938	RADAR ALTIMETER FAILURE					
FD835/836	COMPRESSOR STALL					
FD803/804	LUBE PUMP SHAFT FAILURE					
FD843/844	P-3 SIGNAL LOSS					
FA751	GENERATOR FAIL (.751/752)					
DE200	SONAR RAISE MALFUNCTIONS					
DE400	BOTTOMED DOME					
DE500	HUNG DOME					

HS 1 (TAEG) TRAINING FORM REV. 2 (11 DEC 80) BSF-3

SIDE 2

TASK CODE		QUALIFIED	COND QUALIFIED	UNQUALIFIED	NUMBER TRIALS/ PROFICIENCY

COCKPIT PROCEDURE				
PREPARATION				
HEADWORK				
DISCUSS. AUTO AND ALTERNATE APPROACHES				
HOVER DEPARTURE PROCEDURES. MANUAL CLIMBOUT				
SWIMMER DEPLOYMENT				
PROCEDURES (40 FOOT HOVER, 15 FOOT HOVER AND 10 FOOT				
10 KNOT APPROACH)				
SYSTEMS KNOWLEDGE:				

COUPLER, LIGHTING

TASK CODE	TASK COMMENTS

INSTRUCTOR SIGNATURE	TRAINING OFFICER REVIEW

Initial Conditions (IC)

IC 13

PAGE 10

PARAMETER CHANGE/MONITOR PAGE

CODE		VALUE
	AIRCRAFT PARMETERS	
.10	POSITION (+N-S) (Ø-15Ø NM)	-74.9
.11	POSITION (+E-W) (Ø-15Ø NM)	16.0
.12	ALTITUDE (Ø - 12ØØØ FT MSL)	18
.13	HEADING (DEG, MAG)	090
.14	GROSS WEIGHT (21ØØØ LBS MAX)	18981
.15	LONG CTR OF GRAVITY (IN) (258 276)	266
	ENVIRONMENT PARAMETERS	
.2Ø	BARO PRESSURE (29 - 31 IN HG)	29.92
.21	FIELD TEMP (-3Ø TO +5Ø DEG C)	25
.22	WIND DIRECTION FROM (DEG, MAG)	090
.23	WIND SPEED (Ø - 5Ø KTS)	10
.24	GUST AMPLITUDE (KTS)	0
.25	SOUND SIMULATION (%)	25
.26	VIBRATION LEVEL (%)	50
.27	SEA STATE (Ø-5)	2
	LT THROTTLE POSITION ERROR	-78
	RT THROTTLE POSITION ERROR	- 2

ALT		UHF 1
V VEL		UHF 2
AIRSPEED	0	HF
HEADING		TACAN
R TAC	1	LF/ADF
B TAC	270	IFF
R NDB		
B NDB		
TORQUE		
BNK ANG		

IC 13

PAGE 15

AIRCRAFT WEIGHT AND BALANCE

CODE		VALUE
.1Ø	SENSOR OPERATOR (Ø/1/2)	2
	FUEL	
.11	FWD TANK	1400
.12	CTR TANK	600
.13	AFT TANK	2000
	CARGO	
.14	EXTERNAL	0
.15	INTERNAL	450
	STORES	
.16	B-57 DEPTH BOMB (LF/RF)	
.17	MK-44 TORPEDO (LF/RF)	
.18	MK-46 TORPEDO (LF/RF)	
.19	AN/ALE -37 CHAFF (LA/RA)	
.2Ø	AN/ASQ-81 (V)-2 MAD	
.21	SMOKE MARKER LAUNCHER (2)	2
.22	MK-15 MARINE MARKER (24)	24

TUBE LOADED SONOBOUYS

CODE		TYPE	CODE		TYPE
.31	TUBE No. 1	Ø	.37	TUBE No. 7	Ø
.32	TUBE No. 2	Ø	.38	TUBE No. 8	Ø
.33	TUBE No. 3	Ø	.39	TUBE No. 9	Ø
.34	TUBE No. 4	Ø	.4Ø	TUBE No. 1Ø	Ø
.35	TUBE No. 5	Ø	.41	TUBE No. 11	Ø
.36	TUBE No. 6	Ø	.42	TUBE No. 12	Ø

41 = SSQ-41 5Ø = SSQ-5Ø 62 = SSQ-62
47 = SSQ-47 53 = SSQ-53 72 = SSQ-72

PRESENT TOTAL WEIGHT (21ØØØ LBS MAX)
PRESENT CG STATION (258 TO 276)

ALT		No. 1 ENG	ON
V VEL		No. 2 ENG	OFF
AIRSPD	0	BLADES	SPREAD
HEADING		ROTOR	DISENGAGED
R TAC	1	UHF	1
B TAC	270	UHF	2
R NDB		HF	
B NDB		TACAN	NIP 48
TORQUE		LF/ADF	
BNK ANG		IFF	

BSF-3 SIMULATOR SCENARIO

OBJECTIVE

The objective of this flight is to allow the student to refresh previously learned skills, practice tasks introduced or demonstrated on BSF-2, and introduce new tasks. At the conclusion of this flight the student should have developed (1) the skills required for a night flight in the SH-3 aircraft and (2) a level of proficiency in basic instrument skills required to perform the maneuvers associated with sonar dipping approaches and SAR procedures.

BRIEFING INFORMATION

The instructor should brief on the various maneuvers to be practiced on this flight and explain the procedures to be utilized for introducing the new tasks scheduled for training. In addition, the following items will be briefed as appropriate for this flight.

CREW BRIEF

1. Flight Gear/SAR Gear
2. Ditching
   a. Over Land
      (1) Controlled
      (2) Uncontrolled
   b. Over Water
      (1) Controlled
      (2) Uncontrolled
   c. Water Takeoff
3. Lookout

   Taxi and inflight
4. Coupler Procedures
   a. Pot/Switch Movements
   b. Cable Centering
   c. Depth Changes
   d. Sonar ICS
5. SAR Procedures
   a. Lookout (IFR/VFR)
   b. Equipment Prep
   c. Smoke Matrix Use
   d. Hover Coordination
      Hover Trim/Talkover (IFR/VFR)
   e. Swimmer Deployment (IFR/VFR)
   f. Lost ICS Comm

COPILOT BRIEF

1. Cockpit Coordination
   a. Checklist Method
   b. Practice Autorotations
   c. Power/Scan Backup
2. Comm. Responsibilities

   IFR/VFR emergencies
3. Vertigo/Disorientation
   a. Notification
   b. Parameters
4. Emergencies
   a. Control of Aircraft
   b. Dual Concurrence
   c. Immediate Action
      (1) Eng Fire
      (2) Eng Malf
      (3) Hardover
      (4) T/R Loss
      (5) Dual Eng Loss
      (6) Others: Use Checklist

2F64C (SH-3) Scenario
Developed by TAEG
BSF-3 Page 1 of 11
Revision Date: 25 Aug 1981

TAEG Report No. 108

SPECIAL BRIEFING ITEMS FOR THIS FLIGHT

1. Aircraft/Simulator Start

   a. Interior and Exterior Preflight Inspections--complete
   b. Hot seat change, No. 1 engine running, blades spread, rotorbrake ON
   c. Complete all checklists.

2. Communications

   Make all applicable radio calls, call sign "ALPHA ROMEO ____".

3. Taxi, Takeoff, and Flight

4. Approach Map for NAS Jacksonville and Jacksonville Sectional Chart should be used to brief students on departure and return route to NAS Jacksonville and NS Mayport.

Flight Equipment

Helmet, Boots, Flight Suit, Gloves, Dog Tag

Navigation Charts, Approach Plates, and Radio Frequencies Available

En route Low Altitude Charts 19/20
Vol. 9, Low Altitude Instrument Approach Procedures, S.E.
Radio Frequency Card for Jacksonville Area

FREQUENCIES THAT MAY BE REQUIRED ON THIS FLIGHT

Station	Channel/Freq.	Button
NIP TACAN	48	
NIP Ground Control	336.4	2
NIP Tower	355.8	3
NRB Ground Control	233.7	6
NRB Tower	265.8	5
NRB TACAN	51	
NIP GCA	374.8	
SEALORD	338.1	

2F64C (SH-3) Scenario
Developed by TAEG
BSF-3 Page 2 of 11
Revision Date: 25 August 1981

BSF-3 SIMULATOR SCENARIO, STUDENT NO. 1

1. Simulator Setup:

a. Check safety mat free of objects, ramp and walkway clear
b. Lower safety bar and close door
c. Raise ramp and ensure UP light illuminated
d. Students--briefed on EMERGENCY EGRESS FROM TRAINER
e. Safety belts--ON
f. Master power, trainer power, and freeze lights illuminated
g. MAT, DOOR, HI TEMP, LOW OIL, GATE, and RAMP indicator lights out
h. Motion--ON
i. Ensure all systems are ON and rotor brake is ON
j. Set IC-13, check for a match of parameters. If correct press IC ENTER. No. 1 engine should be running, blades spread, Accessory Drive Switch in Access Dr position. Aircraft is at Spot 4. Begin with Systems Check.

2. Systems Check:

TACNAV and Coupler/Doppler Checks (Initialization)

3. Start No. 2 engine:

Engage rotor

4. Pre-taxi:

Contact Clearance Delivery

a. "Navy Jax Clearance Delivery, ALPHA ROMEO ___ NIP 32 to W158E to Mayport."

b. "ALPHA ROMEO ____, clearance on request."

5. Taxi Checklist:

a. "ALPHA ROMEO ____, Clearance Delivery, advise when ready to copy clearance."

b. Acknowledge.

(1) "ATC clears ALPHA ROMEO ___ flight plan route as filed. After takeoff maintain runway heading, climb to 2,000 contact JAX Departure on frequency 351.8, Squawk Mode 3, Code 0401. Readback."

(2) Readback.

2F64C (SH-3) Scenario
Developed by TAEG
BSF-3 Page 3 of 11
Revision Date: 25 August 1981

6. Taxi Clearance omitted for this period due to start at Spot 4.

7. Before Takeoff:

   a. Instructor/student brief
   b. Pre-Takeoff Checklist
   c. Takeoff Checklist
   d. Request Takeoff Clearance.

(1) "Navy Jax Tower, ALPHA ROMEO ___ ready for takeoff, IFR to Whiskey 158 Echo."

(2) "ALPHA ROMEO ___ Altimeter 29.92, wind 090/10 knots, expect your release immediately."

(3) "ALPHA ROMEO ___ cleared for takeoff, begin squawk, maintain a heading of 090, wind 090/10, switch to Jacksonville Departure Control on 351.8."

8. Takeoff (ITO):

   a. Post Takeoff Checklist
   b. Contact Departure

(1) "Jax Departure, Navy Copter ALPHA ROMEO ___ off Navy Jax, climbing to 2,000'."

(2) "ALPHA ROMEO ___, JAX Departure radar contact, turn left to 075, climb to 3,000 for radar vectors to Whiskey 158 Echo."

9. En route malfunction and emergency training.

a. Instructor should state that there is an odor of electrical fire and that smoke is beginning to come from center console. Require student to take action to isolate equipment. (Either of the UHF's.) After action completed state that fire is out and equipment restored.

b. Select a fuel control malfunction (fuel contamination .845 or .846). After appropriate action delete malfunction.

c. Slew aircraft to 25 mile DME on 075 radial of NIP which should place aircraft at the edge of W158E and approximately on the 100 degree radial of Mayport TACAN at approximately 8-9 miles. (Notify student)

d. Contact JAX Departure and cancel IFR clearance. "JAX Departure, ALPHA ROMEO ___ cancel my IFR clearance at this time."

e. Contact SEALORD for clearance to operate in W158E.

2F64C (SH-3) Scenario
Developed by TAEG
BSF-3 Page 4 of 11
Revision Date: 25 August 1981

(1) "SEALORD, ALPHA ROMEO ___ request entry into Whiskey 158 ECHO, 4 souls on board. We will be in the area for 0+45 and will be dropping smokes."

(2) "ALPHA ROMEO ____, SEALORD, entry into Whiskey 158 ECHO approved, Squawk Mode 3, Code 4000. Remain this frequency for flight following. Report OPS Normal on the hour and the half-hour. Advise leaving the warning area."

(3) Acknowledge.

10. Descend to 300 feet and begin low altitude training.

a. Enter an ASE malfunction (.879 to .890) and require low altitude ASE off flight.

b. After malfunction action completed remove malfunction and prepare for AUTO APPROACH.

11. Auto Approach

a. Perform Pre-dip checklist
b. Initiate Automatic Approach
c. Deploy Sonar
d. Introduce use of Cable Altitude
e. Raise sonar and break hover for a second approach.

12. AUTO APPROACH in RAD ALT

a. Initiate AUTO APPROACH
b. Deploy sonar
c. Verbal control positioning
d. Enter RAD ALT failure to require FREESTREAM Recovery (.938 OR .977).

13. Alternate Approach Pilot Procedures and Alternate Approach Copilot/Voice Procedures. (Trained simultaneously in the simulator.)

a. Initiate approach
b. Deploy sonar
c. Make a second approach and third approach, deploy sonar.

Fail a Generator (.751). STUDENT SHOULD NOT TRY TO RESET WHILE IN A HOVER.

14. Demo of IFR SAR Scenario

a. Press FREEZE
b. Select DEMO for IFR SAR Scenario ____ on Digi switches

2F64C (SH-3) Scenario
Developed by TAEG
BSF-3 Page 5 of 11
Revision Date: 25 August 1981

c. At the conclusion of the briefing the FREEZE will illuminate, then
d. Press FREEZE again and DEMO will begin. At the conclusion of the DEMO trainer will reset to condition existing prior to the demonstration.

15. Climb to 1,500 and contact SEALORD and report leaving the area.

a. Contact JAX Approach Control for IFR clearance to Mayport.

(1) "JAX Approach Control, ALPHA ROMEO ____ at 1,500 on the 100 degree radial of Mayport at the ___ mile DME, request IFR clearance to Naval Station Mayport."

(2) "ALPHA ROMEO ____, JAX Approach, Squawk Mode 3, Code 0245."

(3) Acknowledge

(4) "ALPHA ROMEO ____, JAX Approach Radar contact ___ miles ______ of Mayport, turn _____ to ____, climb to and maintain 2,000."

(5) Acknowledge. Instructor call up Mayport Approach Map and vector to intercept the 075 radial on not more than a 30° angle at least 14 miles out.

(6) "ALPHA ROMEO ____, 2 miles southeast of PARNEL, cleared for a TACAN Approach to Navy Mayport. Mayport weather 700 broken and 2 miles with haze, wind 240/10, altimeter _______."

b. Landing Checklist

(1) "ALPHA ROMEO ____, show you ___ miles crossing the _____ radial of Mayport, contact Mayport Tower on 265.8. Over."

(2) "Mayport Tower, ALPHA ROMEO ____."

(3) "ALPHA ROMEO ___, Mayport Tower, report at the 4 mile DME, Mayport weather 500 broken 1½ miles with haze, wind 240/10, altimeter 29.92. Over."

16. While in the TACAN arc fail an engine with a compressor stall (.836) and require student to continue approach.

Contact tower and advise of problem.

a. "Mayport Tower, ALPHA ROMEO ___ have secured No. 2 engine, I am declaring an emergency, request emergency equipment to stand by."

b. "Roger ALPHA ROMEO ___, you are cleared to land, emergency equipment standing by, report field in sight."

c. Report field in sight at about 1 mile.

2F64C (SH-3) Scenario
Developed by TAEG
BSF-3 Page 6 of 11
Revision Date: 25 August 1981

17. After landing, shut down simulator in landing position by activating freeze as the second student will begin flight with No. 1 engine running.

BSF-3 SIMULATOR SCENARIO, STUDENT NO. 2

1. Simulator Setup:

   a. Check safety mat free of objects, ramp and walkway clear
   b. Lower safety bar and close door
   c. Raise ramp and ensure UP light illuminated
   d. Safety belts--ON
   e. Master power, trainer power, and freeze lights illumiated
   f. MAT, DOOR, HI TEMP, LOW OIL, GATE and RAMP indicator lights out
   g. Freeze--ON
   h. Motion--ON.

2. Check for a match of parameters.

   a. Initiate the problem with No. 1 engine running, systems checks complete and blades spread. Include Navigator and Coupler/Doppler Checks required for dipping and Dip to Dip Navigation.

   b. Freeze--OFF.

3. Before taxi checklist:

   Contact Mayport Ground Control for clearance, 233.7/Button 6.

   a. "Mayport Ground Control, ALPHA ROMEO ___, IFR to Whiskey 158 Echo thence to Navy Jacksonville."

   b. "ALPHA ROMEO ___ clearance on request, cleared to taxi to pad ___. Navy Mayport weather 800 broken, wind 200/5 knots, altimeter 29.89. Over."

   c. "ALPHA ROMEO ___."

   d. "ALPHA ROMEO ___ I have your clearance, report when ready to copy."

   e. "ALPHA ROMEO ___ ready to copy."

   f. "ATC clears ALPHA ROMEO ___ to Warning Area 158 Echo direct, maintain 2,000. Maintain runway heading after takeoff, contact Jacksonville departure Control on 381.5, Squawk Mode 3, Code 0414. Readback."

   g. Readback

   h. "Readback correct, contact Mayport Tower on 265.8 when ready for takeoff."

2F64C (SH-3) Scenario
Developed by TAEG
BSF-3 Page 8 of 11
Revision Date: 25 August 1981

4. Takeoff:

a. Instructor brief
b. Pre-takeoff checklist
c. Takeoff checklist
d. Request takeoff clearance, switch to Mayport Tower 265.8/button 5.

(1) "Mayport Tower, ALPHA ROMEO__, ready to lift IFR to Whiskey 158 Echo."

(2) "ALPHA ROMEO ___ begin squawk, cleared to lift, maintain runway heading after takeoff, wind 200/5, switch to Jacksonville Departure on 381.5, monitor Guard."

(3) Acknowledge.

5. Instrument Takeoff:

After takeoff contact Jacksonville Departure on 381.5 and complete Post-Takeoff Checklist.

a. "Jacksonville Departure, Navy Copter ALPHA ROMEO ___ off Mayport."

b. "ALPHA ROMEO ___, Jacksonville Departure, radar contact, turn left to intercept the 100 degree radial of Mayport, maintain 2,000. Report passing 13 mile DME."

c. "ALPHA ROMEO ___ at the 13 mile DME on 100 degree radial of Mayport request descent to 1,600."

d. "ALPHA ROMEO ___ cleared to descend to 1,600 at pilot discretion; report VFR. If unable to maintain VFR at that altitude, contact Approach Control this frequency for further clearance."

e. "Jacksonville Departure, ALPHA ROMEO ___ contact at 1,600; request permission to leave your frequency."

f. "Roger ALPHA ROMEO ___, cleared to leave this frequency, IFR canceled at ______. Contact Jacksonville Approach on 351.8 when ready to reactivate flight plan."

6. Contact SEALORD for clearance into W158E.

a. "SEALORD, ALPHA ROMEO ___, request entry into Whiskey 158 Echo, 4 souls on board. We will be in the area for 0+45 and will be dropping smokes."

b. "ALPHA ROMEO ____, entry into Whiskey 158 Echo approved, squawk Mode 3, Code 4000. Remain this frequency for flight following. Report OPS NORMAL on the hour and half-hour. Advise leaving the warning area."

2F64C (SH-3) Scenario
Developed by TAEG
BSF-3 Page 9 of 11
Revision Date: 25 August 1981

c. Acknowledge.

7. Descend to 300 to commence practice approaches.

a. AUTO APPROACH

(1) Perform Pre-dip checklist
(2) Initiate AUTO APPROACHES, complete two approaches, deploy sonar.

b. Sonar Deployment and Sonar Voice Procedures

(1) Use of CABLE ALTITUDE
(2) Sonar Raise Malfunctions
(3) AUTO APPROACH IN RAD ALT.

(a) Hung Dome
(b) Bottomed Dome.

c. While in a hover with sonar deployed, enter ASE Malfunction (.879-.884).

d. Commence FREESTREAM Recovery.

8. ALTERNATE APPROACH PILOT PROCEDURES and ALTERNATE APPROACH COPILOT/VOICE PROCEDURES.

a. Practice at least two approaches with DIP to DIP Nav between approaches.

b. Doppler Off Approach.

9. Coach student through and introduce SAR Search Procedure and WINDLINE Rescue Procedure.

Instructor give VERBAL CONTROL POSITIONING to pilot.

10. Climb to 1,600 and contact SEALORD departing area. Time permitting contract JAX Approach to activate clearance to Navy JAX.

a. "JAX Approach, Navy Copter ALPHA ROMEO ____ at 1,600 on the 100 degree radial of Mayport at 12 miles, request activate my clearance to Navy Jacksonville."

b. "ALPHA ROMEO ____, maintain VFR, clearance on request, Squawk Mode 3, Code 0224, Ident."

c. "ALPHA ROMEO ____, JAX Approach, cleared to Navy Jacksonville Airport via radar vectors, turn left to 270 and climb to 3,000, report reaching 3,000."

11. Instructor slew aircraft to 8 mile fix for GCA to RWY 27. Change wind to 250/05.

12. Select a malfunction that will require single engine malfunction analysis and a single engine landing or a landing using manual throttle. Lube Pump Shaft Failure (.803/.804) or P-3 Loss (.843/.844).

Single engine landing or manual throttle landing.

13. Shutdown in position by utilizing FREEZE.

APPENDIX C

CONTROL GROUP TRAINING TASKS

TASKS REQUIRING SEQUENCE OF GRADED TRIALS

Cockpit Procedures Trainer

Hot Start

Flex Shaft Failure No. 1 Engine

Lube Pump/Shaft Failure

Flex Shaft Failure on Engagement

Rotor Brake Light on During Engagement

Tail Takeoff Failure on Deck

Utility Hydraulic System Malfunction

Auxiliary Hydraulic System Malfunction

Primary Hydraulic System Malfunction

Fuel Bypass

Fuel Control/System Malfunction

P-3 Loss/Leak

Flex Shaft Failure in Flight

NG Tach Failure

NG Signal Loss

Compressor Stall

T5 Malfunction

Engine Oil Temperature Gauge Malfunction/Overtemp

Engine Oil Pressure Fluctuation/Loss

Engine Failure

Engine Fire/Engine Compartment Fire

Torque System Failure   1 Needle/1 Gauge

Torque System Failure   Both Needles/1 Gauge

Torque System Failure   Same Needle/2 Gauges

Torque System Failure   Both Needles/2 Gauges

Intermediate and Tail Gearbox Chip Light

Tail Takeoff Failure

Electrical Failure

Main Gear Box Chip Light

Main Gear Box Low Oil Pressure/High Oil Temperature

Main Gear Box Low Oil Pressure/Light Gauge/Both

Main Gear Box High Oil Temperature/Light/Gauge/Both

Massive Oil Loss

Main Gear Box Secondary Pump Loss/Utility Pressure

Rotor Brake Malfunction Airborne

Landing Gear Malfunction

Manual Rotor Brake Failure

Post Shutdown Fire

Air Restart

Main Gear Box Tail Takeoff Failure/Light Only

Oil Pump Pressure Loss

Engine Oil Loss

Engine Oil Temperature Rising

Axial Shaft Failure on Start

Water Operations

High Speed Shaft Failure

Auxiliary Servo Malfunction

Pr[illegible]y Servo Malfunction

Introduced in Cockpit Procedures Trainer and

Continued Training in "A" Stage (SH-3 Aircraft)

Normal Start

Blade Spread

Systems Check

Number 2 Engine Start

Rotor Engagement

Manual Throttle Technique

Shutdown

Rotor Disengagement

Bladefold

Number 1 Engine Secure

ASE Malfunction

"A" Stage Flight (SH-3 Aircraft)

Preflight

Normal Takeoff

Running Takeoff

ASE Off Flight

Auxiliary/Primary Off Flight

Single Engine Failure

Single Engine Malfunction Analysis

Single Engine Approach Runway

Single Engine Landing Runway

Single Engine Approach Pad

Single Engine Landing Pad

Single Engine Waveoff

Single Engine Malfunction Takeoff Abort

Normal Approach

Normal Landing

Run On Landing

Auxiliary Off Landing

Servo Malfunctions

Introduced in "A" Stage and Continued Training in "B" Stage

ASE Off Landing

ASE Off Takeoff

Autorotations

"B" Stage Flight (SH-3 Aircraft)

Instrument Takeoff

Unusual Attitudes

ADF Approach

TACAN Approach

GCA Approach

ASR Approach

No Gyro Approach

Mirror Approach

Single/Dual Generator Failure on Deck

Automatic Approach Pilot Procedures

Automatic Approach Radar Altimeter Procedures

Automatic Approach Hover Departure Procedures

Alternate Approach Pilot Procedures

Alternate Approach Copilot Procedures

Alternate Approach Voice Procedures

Sonar Deployment Voice Procedures

Doppler Failure

Radar Altimeter Failure

Generator Failure

Beeper Trim Failure

Hung Dome

Bottomed Dome

Free Stream Recovery

SAR Search

SAR Manual Approach

Windline SAR Pilot Procedures

Windline SAR Copilot Procedures

Ten foot Hover Swimmer Deployment

Verbal Control Positioning

Dip to Dip Navigation

Manual Climbout

ASE Failure

Practice Single Engine

Flight Tasks Requiring Overall "P" Grade

(No Graded Trial Sequence)

Cockpit Procedures Trainer

Battery Start

Hung Start

Warm Start

No Oil Pressure on Start

Introduced in Cockpit Procedures Trainer and Continued

Training in "A" Stage (SH-3 Aircraft)

Taxi Checklist

Pre Takeoff Checklist

Takeoff Checklist

Post Takeoff Checklist

Before Landing Checklist

After Landing Checklist

Post Flight

"A" Stage Flight (SH-3 Aircraft)

LSE Signals

Course Rules

Taxi

Normal Flight

Beeper Trim, Stick Trim, Bar Alt

Pad Work (Day)

Dual Engine No Hover Pad Landing

Cut Gun in 10-foot Hover

Introduced in "A" Stage Flight and Continued Training in "B" Stage (SH-3 Aircraft)

Basic Airwork

Cockpit Procedures

"B" Stage Flight

Pre-Flight Planning

Navigator Check

Coupler Doppler Check

Level Speed Changes

Partial Panel

Steep Turns

Climbing and Descending Timed Turns

Airway Navigation

Pad Work (Night)

Pre Dip Checklist

Use of Cable Altitude

Sonar Raise Malfunctions

Manual Cable Angle Hover

Low Level ASE ON

Low Level ASE OFF

APPENDIX D

TASK LISTING AND MATRIX OF TASKS TRAINED IN VARIOUS MEDIA

TASK ID TABLE

No	ID	Description
1	AB100	RECORDS CHECK
2	AC100	PRE-FLIGHT
3	AC200	POST-FLIGHT
4	AD100	NORMAL START
5	AD101	BATTERY START
6	AD200	BLADE SPREAD
7	AD300	SYSTEMS CHECK
8	AE100	NO. 2 ENGINE START
9	AE200	ROTOR ENGAGEMENT
10	AF100	TAXI CHECKLIST
11	AF200	TAXI
12	AF300	PRE-TAKEOFF CHECKLIST
13	AG100	SHUTDOWN CHECKLIST
14	AG200	ROTOR DISENGAGEMENT
15	AG300	BLADE FOLD
16	AG400	NO. 1 ENGINE SECURE
17	AG500	HOT SEAT CHANGE
18	AH100	LSE SIGNALS
19	AH200	PRE-FLIGHT PLANNING
20	BA100	TAKEOFF CHECKLIST
21	BA200	POST TAKEOFF CHECKLIST
22	BA300	BEFORE LANDING CHECKLIST
23	BA400	AFTER LANDING CHECKLIST
24	BA500	CHECKLISTS
25	BB100	INSTRUMENT DEPARTURE
26	BC200	UNUSUAL ATTITUDES
27	BC300	SPEED CHANGES
28	BC400	STEEP TURNS
29	BC500	CLIMBING, DESENDING TIMED TURNS
30	BC600	AIRWAYS NAVIGATION
31	BC700	LEVEL TURNS
32	BC701	BEEPER TRIM OFF LIGHT
33	BD100	USE OF BAR ALT/AND BEEPER TRIM
34	BD200	D MODE DEMO
35	BD300	DOPPLER DEMO
36	BE100	NORMAL TAKEOFF
37	BE200	RUNNING TAKEOFF
38	BE201	MAX GROSS TAKEOFF
39	BE202	NO HOVER LANDING DEMO
40	BE300	INSTRUMENT TAKEOFF
41	BE400	APPROACH PROCEDURES
42	BE401	ADF APPROACH
43	BE402	TACAN APPROACH
44	BE403	GCA APPROACH
45	BE404	ASR APPROACH
46	BE405	NO GYRO APPROACH
47	BE406	MIRROR APPROACH
48	BE407	PARTIAL PANEL (.926 TO .927)
49	BE408	HOLDING
50	BE409	MISSED APPROACH

TASK ID TABLE

No	ID	Description
51	BE500	NORMAL LANDING
52	BE501	NORMAL LANDING RUNWAY
53	BE502	NORMAL LANDING PAD
54	BE600	RUN ON LANDING
55	BE700	NORMAL APPROACH
56	BE701	NORMAL APPROACH RUNWAY
57	BE702	NORMAL APPROACH PAD
58	BE800	INSTRUMENT LANDING
59	BF100	PAD WORK
60	BF200	NIGHT PAD WORK
61	BG100	COURSE RULES
62	BG200	BASIC AIRWORK
63	BG201	BASIC INSTRUMENTS
64	BG400	COMMUNICATIONS EMERGENCIES & MALFUNCTIONS
65	BG401	CLEARANCES
66	BG500	NIGHT LIGHTING PROCEDURES
67	CA100	AUTOROTATION
68	CB100	SINGLE ENGINE APPROACH RUNWAY
69	CB200	SINGLE ENGINE LANDING RUNWAY
70	CB300	SINGLE ENGINE APPROACH PAD
71	CB400	SINGLE ENGINE LANDING PAD
72	CB500	SINGLE ENGINE WAVEOFF
73	CB600	SINGLE ENGINE MALF TAKEOFF/ABORT
74	CC100	AUX OFF/PRI OFF LANDING
75	CD100	ASE OFF TAKEOFF
76	CD300	ASE OFF LANDING
77	CE100	ASE OFF FLIGHT
78	CE200	AUX/PRIMARY OFF FLIGHT
79	CE300	MANUAL THROTTLE
80	CE400	PRACTICE S/E
81	CE500	SINGLE ENGINE MALFUNCTION ANALYSIS
82	CE600	SINGLE ENGINE MALF T/O ABORT
83	CF100	FUSELAGE FIRE
84	DA100	TAC NAV CHECK
85	DA200	TAC NAV & COUPLER DOPPLER TEST
86	DA300	PRE-DIP CHECKLIST
87	DA500	SONAR DEPLOYMENT VOICE PROCEDURES
88	DB100	AUTO APPROACH PILOT PROCEDURES
89	DB200	AUTO APPROACH RAD ALT PROCEDURES
90	DB300	HOVER DEPARTURE PROCEDURES
91	DB400	AUTO/ALT APPROACH WAVEOFF PROCEDURES
92	DC100	ALTERNATE APPROACH PILOT PROCEDURES
93	DC200	ALTERNATE APPROACH COPILOT/VOICE POCEDURES
94	DD100	MANUAL CLIMB OUT (VFR)
95	DD101	MANUAL CLIMB OUT (IFR)
96	DE100	FREESTREAM RECOVERY
97	DE200	SONAR RAISE MALFUNCTIONS
98	DE300	DOPPLER FAILURE (.929 TO .930)
99	DE400	BOTTOMED DOME
100	DE500	HUNG DOME

TASK ID TABLE

No	ID	Description
101	DE800	COUPLER FAILURE (.895 TO .900)
102	DE912	BEEPER TRIM FAILURE
103	DE914	CYCLIC TRIM LOCK UP FORE-AFT
104	DE916	BAR ALT FAILURE
105	DE938	RADAR ALTIMETER FAILURE
106	DF100	USE OF CABLE ALTITUDE
107	DF200	MANUAL CABLE ANGLE HOVER
108	DG100	LOW LEVEL ASE ON FLIGHT
109	DG200	LOW LEVEL ASE OFF
110	DG300	COUPLER CRUISE
111	EA200	DIP ~~TO DIP~~ NAVIGATION
112	EA300	SAR SEARCH
113	EA400	SAR MANUAL APPROACH
114	EA500	WINDLINE SAR PILOT PROCEDURES
115	EB100	IFR SAR SCENARIO DEMO
116	EC100	10/15 FT HOVER SWIMMER DEPLOYMENT
117	ED100	VERBAL CONTROL POSITIONING
118	FA750	ELECTRICAL MALFUNCTION
119	FA751	GENERATOR FAILURE
120	FA756	ELECTRICAL FIRE
121	FA973	FIRE EXTINGUISHER C.B.
122	FA998	RAWS FAILURE C.B.
123	FB878	ASE FAILURE (.879 TO .890)
124	FC775	TRANSMISSION SYSTEM FAILURES (.776 TO .789)
125	FC776	MGB LOW PRESSURE/HIGH TEMPERATURE
126	FC777	IMMEDIATE LOSS OF TANS OIL PRESS
127	FC778	MGB SECONDARY OIL PUMP FAILURE
128	FC779	Q SYSTEM-MALFUNCTION
129	FC780	TAIL-TAKEOFF LIGHT ONLY
130	FC781	TAIL TAKEOFF FAILURE
131	FC782	MAIN TRANSMISSION CHIP LIGHT
132	FC783	INTERMEDIATE GEAR BOX CHIP LIGHT
133	FC784	TAIL GEAR BOX CHIP LIGHT
134	FC785	MGB OIL PRESSURE CAUTION LIGHT
135	FC786	TRANSMISSION OIL OVERHEAT
136	FC788	MGB MASSIVE OIL LOSS
137	FC863	Q SYSTEM-1 NEEDLE, 1 GAGE
138	FC864	Q SYSTEM-2 NEEDLES, 1 GAGE
139	FC865	Q SYSTEM-1 NEEDLE, 2 GAGES
140	FC866	Q SYSTEM-2 NEEDLES, 2 GAGES
141	FD803	LUBE PUMP SHAFT FAILURE
142	FD805	ENGINE GRADUAL OIL PRESSURE LOSS
143	FD807	ENGINE IMMEDIATE OIL PRESSURE LOSS
144	FD811	ENGINE OIL TEMPERATURE HIGH
145	FD813	ENGINE OIL PRESSURE FLUCTUATIONS
146	FD815	ENGINE FIRE
147	FD817	POST SHUTDOWN FIRE
148	FD819	HOT START
149	FD821	WARM START
150	FD823	STARTER HANGUP

TASK ID TABLE

No	ID	Description
151	FD833	T5 MALFUNCTION
152	FD835	COMPRESSOR STALL
153	FD837	NG SIGNAL LOSS
154	FD839	AXIAL SHAFT FAIL
155	FD841	FLEX SHAFT FAILURE
156	FD843	P-3 SIGNAL LOSS OR LEAK
157	FD845	FUEL CONTROL CONTAMINATION
158	FD851	HIGH SPEED SHAFT FAILURE
159	FD857	NG TACH FAILURE
160	FE798	TAIL ROTOR CONTROL CABLE LOSS
161	FE799	TAIL ROTOR DRIVE SHAFT FAILURE
162	FF763	FUEL FILTER BYPASS
163	FG768	AUX HYD PUMP FAILURE
164	FG769	PRIMARY HYD PUMP FAILURE
165	FG770	UTILITY HYDRAULIC PUMP FAILURE
166	FG773	HYDRAULIC PRESSURE INTERLOCK SENSOR FAILURE
167	FG793	LANDING GEAR MALFUNCTION
168	FG907	SERVO MALFUNCTIONS
169	FG909	PRIMARY SERVO MALFUNCTIONS (.910 TO .911)
170	FG910	PRIMARY SERVO LOCK
171	FG911	PRI HYDRAULIC HARDOVER FORE-AFT
172	FH102	DUAL ENGINE WATER LANDING
173	FH103	WATER TAXI
174	FH104	DUAL ENGINE WATER TAKEOFF
175	FH105	SINGLE ENGINE WATER LANDING
176	FH106	SINGLE ENGINE WATER TAKEOFF
177	FI771	MANUAL ROTOR BRAKE FAILURE
178	FI772	ROTOR BRAKE CAUTION LIGHT
179	FI795	BLADE DAMPNER FAILURE
180	FJ100	POWER SETTLING
181	FJ200	BLADE STALL
182	FJ501	MAD DEPLOYMENT DEMO
183	FJ700	HIGH SPEED FLIGHT
184	FJ800	CUT GUN IN 10' HOVER
185	FK917	VGI FAILURE (927)
186	FK927	VGI OFF FLAG
187	FK939	TACAN AZIMUTH & DME FAILURE
188	FK940	TACAN DME FAILURE
189	FK941	UHF NO. 1 RECEIVER FAILURE
190	FK943	UHF NO. 1 TRANSMITTER FAILURE

GRADE CARD TO TASK ID CROSS REFERENCE

TASK ID	AW 1	AW 2	AW 3	AW 4	AW 5	AW 6	AW 7	AS F1	AS F2	AS F3	AS F4	AS F5	AS F6	AS F7	AF 1	AF 2	AF 3	AF 4	BS F1	BS F2	BS F3	BS F4	BS F5	BS F6	BF 1	BF 2	BF 3	BF 4	EW 1	ES F1	E1	NONE	TOTAL
AC100															1	1	1	1													1		5
AC200															1	1	1	1													1		5
AD100	1	1			1			1	1			1		1	1	1	1	1		1									1	1			14
AD101		1																															1
AD200	1	1			1			1	1					1	1	1	1	1											1	1			12
AD300	1	1	1	1	1	1		1				1		1	1	1	1	1		1		1							1	1	1		19
AE100	1	1	1	1	1			1	1	1	1	1		1	1	1	1	1		1		1							1		1		19
AE200	1	1	1	1	1			1	1	1		1	1	1	1	1	1	1		1									1				17
AF100	1	1						1	1						1	1																	6
AF200								1	1						1	1	1	1													1		7
AF300	1	1	1	1	1			1	1						1	1																	9
AG100	1	1	1	1		1		1	1	1	1	1	1	1	1	1		1											1		1		17
AG200	1	1	1	1		1		1	1	1	1		1	1	1	1	1	1											1				16
AG300	1	1	1										1	1	1	1	1	1															9
AG400	1	1	1	1		1		1	1					1	1	1	1	1											1				13
AG500								1	1																								2
AH100															1			1															2
AH200												1																					1
BA100	1	1	1	1	1			1	1						1	1																	9
BA200	1	1	1	1	1			1	1						1	1																	9
BA300	1	1	1	1		1		1	1						1																		8
BA400	1	1	1	1		1		1	1						1																		8
BA500										1	1	1					1	1	1	1	1	1	1	1									11
BB100										1	1	1							1		1												5
BC200								1							1		1							1									4
BC300								1	1						1																		3
BC400								1	1								1		1														4
BC500								1	1						1				1														4
BC600												1																					1
BC700								1	1						1																		3
BC701								1												1													2
BD100									1						1																		2
BD200								1																									1
BD300								1																									1
BE100								1	1				1		1	1	1	1		1											1		9
BE200										1			1	1	1	1	1	1													1		8
BE201											1																			1			2
BE202																1																	1
BE300									1	1	1	1	1	1		1	1		1		1					1	1						12
BE400												1																					1
BE401										1		1							1	1													4
BE402										1	1	1				1			1		1	1			1					1			9
BE403									1			1			1				1	1	1				1								7
BE404											1																						1
BE405									1																1								2
BE406																									1								1
BE407								1	1						1		1		1					1									6
BE408										1	1	1							1														4
BE409										1	1	1							1		1												5
BE500											1		1			1	1	1													1		6
BE501								1	1					1	1																		4
BE502															1																		1

GRADE CARD TO TASK ID CROSS REFEPENCE

TASK ID	AW 1	AW 2	AW 3	AW 4	AW 5	AW 6	AW 7	AS F1	AS F2	AS F3	AS F4	AS F5	AS F6	AS F7	AF 1	AF 2	AF 3	AF 4	BS F1	BS F2	BS F3	BS F4	BS F5	BS F6	BF 1	BF 2	BF 3	BF 4	EW 1	ES F1	E1	NONE	TOTAL
BE600										1	1		1	1	1		1	1													1		8
BE700														1		1	1	1													1		5
BE701															1																		1
BE702															1																		1
BE800												1																					1
BF100															1	1																	2
BF200																									1								1
BG100															1																		1
BG200																											1						1
BG201																	1			1				1									3
BG400								1	1	1	1	1							1														6
BG401												1																					1
BG500													1	1					1		1				1		1						6
CA100											1		1	1		1	1	1	1	1		1	1	1		1		1		1	1		15
CB100											1		1	1		1	1	1												1	1		8
CB200											1		1	1		1	1	1												1	1		8
CB300											1																						1
CB400											1																						1
CB500											1		1	1		1	1	1												1	1		8
CB600											1		1	1		1	1	1		1											1		8
CC100										1			1	1		1	1	1													1		7
CD100										1			1			1	1	1							1						1		7
CD300										1			1	1		1	1	1							1						1		8
CE100									1	1			1			1		1															5
CE200									1				1	1		1	1	1												1	1		8
CE300		1	1				1			1			1	1		1	1	1			1		1							1	1		13
CE400		1	1		1		1																			1		1					6
CE500										1	1		1			1	1	1			1	1	1	2						1	1		12
CE600			1	1																		1											3
CF100																						1											1
DA100																					1												1
DA200																			1		1	1				1	1	1		1			7
DA300																				1	1		1			1		1		1	1		7
DA500																				1	1	1	1	1		1	1	1		1	1		10
DB100																			1	1	1	1	1	1		1	1	1		1	1		11
DB200																				1		1	1	1		1	1	1			1		8
DB300																				1	1		1	1		1	1	1			1		8
DB400																				1													1
DC100																				1	1	1	1	1		1	1	1		1	1		10
DC200																					1	1	1	1		1	1	1			1		8
DD100																										1		1		1			3
DD10.																							1	1									2
DE100																				1	1	1	1	1		1		1		1	1		9
DE200																					1	1	1	1				1		1	1		7
DE300																							1	1				1		1	1		5
DE400																					1		1	1									3
DE500																					1		1	1									3
DE800																						1	1	1						1			4
DE912																				1	1		1	1				1			1		6
DE914																						1											1
DE916																							1										1
DE938																					1	1	1	1		1		1		1	1		8
DF100																					1		1	1		1		1		1			6

GRADE CARD TO TASK ID CROSS REFERENCE

TASK ID	AW 1	AW 2	AW 3	AW 4	AW 5	AW 6	AW 7	AS F1	AS F2	AS F3	AS F4	AS F5	AS F6	AS F7	AF 1	AF 2	AF 3	AF 4	BS F1	BS F2	BS F3	BS F4	BS F5	BS F6	BF 1	BF 2	BF 3	BF 4	EW 1	ES F1	E1	NO NE	TOTAL
DF200																							1	1		1		1					4
DG100																			1	1													2
DG200																			1	1													2
DG300																			1														1
EA200																				1		1	1	1		1		1					6
EA300																						1		1		1		1		1	1		6
EA400																										1		1			1		3
EA500																						1	1	1		1	1	1		1	1		8
EB100																					1												1
EC100																										1		1			1		3
ED100																						1	1	1		1		1					5
FA750					1	1	1																										3
FA751									1			1									1	1	1	1				1	1	1	1		10
FA756									1												1								1				3
FA973											1									1													2
FA998																			1														1
FB878					1	1	1		1	1				1		1				1	1	1	1	1		1		1	1		1		16
FC775							1				1		1	1																			4
FC776				1	1																												2
FC777				1	1						1											1		1									5
FC778				1		1																											2
FC779							1																										1
FC780		1		1	1	1	1							1																			6
FC781				1	1	1	1																	1					1	1			7
FC782				1	1						1									1									1	1			6
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FC785																								1									1
FC786				1		1					1																						3
FC788				1	1																								1				3
FC863				1	1	1																							1				4
FC864				1		1																											2
FC865				1	1																												2
FC866				1																													1
FD803		1	1		1		1		1		1		1	1						1	1		1										11
FD805										1																							1
FD807		1	1				1			1	1																		1				6
FD811			1			1	1				1																						4
FD813			1	1			1												1										1				5
FD815		1	1		1	1	1			1	1		1	1						1		1							1	1			13
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FD819	1	1				1																							1	1			5
FD821	1				1																												2
FD823																																	0
FD833			1	1			1																										3
FD835			1			1	1			1			1	1						1	1	1	1										10
FD837			1			1	1			1				1																			5
FD839		1		1			1			1	1		1	1								1	1										9
FD841		3	1		1		1		1	1			1	2									1						1	1			11
FD843		1	1		1		1			1			1	1						1	1	1	1						1				12
FD845		1	1		1		1			1			1								1								1				8
FD851			1	1			1			1				1								1											6
FD857			1	1			1												1														4

GRADE CARD TO TASK ID CROSS REFERENCE

TASK ID	AW 1	AW 2	AW 3	AW 4	AW 5	AW 6	AW 7	AS F1	AS F2	AS F3	AS F4	AS F5	AS F6	AS F7	AF 1	AF 2	AF 3	AF 4	BS F1	BS F2	BS F3	BS F4	BS F5	BS F6	BF 1	BF 2	BF 3	BF 4	EW 1	ES F1	E1	NO NE	TOTAL
FE798											1		1						1			1	1										5
FE799													1						1			1											3
FF763			1	1			1						1																1	1			6
FG768					1	1	1			1			1	1								1		1					1	1			10
FG769					1	1	1						1						1					1					1				7
FG770					1	1	1					1							1			1							1				7
FG773																														1			1
FG793					1	1	1																										3
FG907													1			1	1	1															4
FG909									1				1																				2
FG910														1																			1
FG911										1												1											2
FH102																				1		1		1									3
FH103																																	0
FH104																				1		1											2
FH105																							1							1			2
FH106																							1							1			2
FI771			1			1	1			1				1					1										1	1			8
FI772		1		1	1	1	1		1		1		1																1	1			10
FI795									1		1		1																				3
FJ100											1																			1			2
FJ200											1																			1			2
FJ501																										1							1
FJ700											1																						1
FJ800													1				1																2
FK917									1			1																					2
FK927																			1					1									2
FK939										1																							1
FK940																				1													1
FK941												1																					1
FK943												1																					1
NONE																																	0
TOTAL	17	29	30	32	32	28	32	28	40	35	38	25	40	39	35	38	35	32	28	34	33	38	36	36	8	24	11	26	31	42	40	0	972

91

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